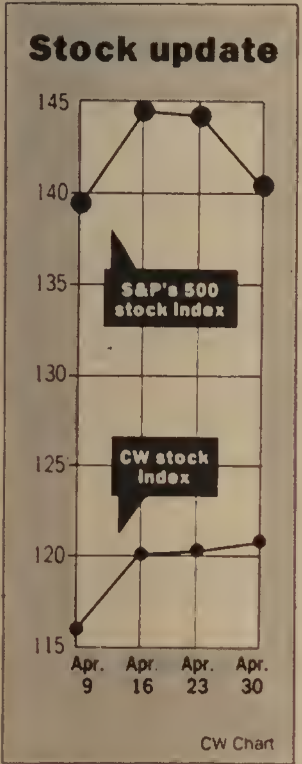
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

COMPUTERWORLD

$2/COPY; $44/YEAR
MAY 5, 1986
VOL. XX, NO. 18



Stock charts in full, page 141

Executive Report
Managing end-user training: how to solve instruction snags/**49**

In Depth
Upgraded Personal Computers best PC ATs for power at low cost/**65**

TOP OF THE NEWS

IBM President John Akers sees a demanding year ahead for the company. **Page 142.**

■

Computervision rolls out its new workstation-based system, while analysts press for a more open software system. **Page 5.**

■

Dexpo South attracts 7,000 DEC users, while third-party vendors grumble about new policies preventing add-on devices. **Page 14.**

■

Pan American's decision to use American Airlines' Sabre reservation system may foreshadow further links between the airlines' DP operations. **Page 2.**

■

NCR users rave about the company's 9800 mainframe but question its speed and memory address space. **Page 6.**

■

Thinking Machines rolls out a massively parallel processing system. **Page 4.**

■

Telecommunications industry turmoil spells opportunity for venture capitalists. **Page 31.**

■

Users rate the Data General MV/20000 and MV/2000 models. **Page 43.**

■

Users of Wang Laboratories equipment are objecting to a new Wang policy that they say charges for all software maintenance support and will begin on July 1. "When Wang gets its service to a level worth paying for, then we'll talk," one user said. Wang spokesmen were not able to comment by press time.

■

The troubled Federal DP & Communications Conference, scheduled for this week in Washington, D.C., was canceled last week by the Interface Group. A spokesman said budget cuts were keeping federal employees away. The 1986 show had been in big trouble since its inception; Interface postponed the show from its original March dates, dropped

See **NEWS** page 4

FCC tickets 2,500 units in Comdex raid

By Douglas Barney

ATLANTA — Six Federal Communications Commission employees swooped down onto the show floor of Comdex/Spring '86 last week, slapping labels on all computer products that failed to meet federal radio frequency emissions regulations.

An estimated 2,500 products were tagged by FCC investigators during the first three days of the popular trade show.

In addition to affixing the labels, which effectively bars the sale of uncertified equipment, FCC officials provided vendors and resellers in attendance at Comdex with information on FCC certification and labeling requirements.

"We encouraged those that have not done it to abide by the rules and regulations to bring them into compliance," said Dorothy Goodrich, a public service specialist involved in the Comdex operation. "There were quite a few surprised faces there."

The FCC's Comdex raid is but one chapter in the agency's recent assault on firms that manufacture or resell computers that do not meet FCC standards. So far, the FCC crackdown has focused mainly on mail-order firms such as PC's Limited, an Austin, Texas, mail-order firm that sells its own brand of machines in addition to other brands of hardware and software.

"We had a couple of products that had not been certified. The application process is somewhat lengthy," said Allen Baden, attorney and assistant to the president for PC's Limited, which has been fined $8,000.

Baden said PC's Limited has since had its product certified and that the experience will help the firm avoid problems in the future. "We have seen some problem serial and parallel ports, so what we are

See **FCC** page 8

Rolm voice linked to VM

IBM office users tied in to voice messaging system

By Elisabeth Horwitt

Phonemail/VM host link, representing the first step toward integrating IBM electronic mail and Rolm Corp. voice messaging systems, is scheduled to be announced jointly today by the two companies, according to a Rolm official.

Phonemail/VM is described as a software option to be offered with Rolm's Phonemail voice messaging systems and will reportedly notify users of messages sent through a VM-based IBM text messaging system such as the Professional Office System.

See **ROLM** page 4

Cincom facing relational test

By Charles Babcock

ORLANDO, Fla. — Users of Cincom Systems, Inc.'s large-system software expressed strong interest in the firm's claims about its latest relational data base management system, Supra, at the annual Cincom users conference last week.

Users were also informed of a new release of Cincom's development language, Mantis, due June 1.

Interest in Supra, announced last fall, was heightened by reports that relational DBMS pioneer E. F. Codd is evaluating the Cincom product at his Relational Institute in San Jose, Calif. Preliminary reports, Cincom officials said, indicated that Supra

See **CINCOM** page 6

CW EXCLUSIVE

McNetwork: Fast-food giant orders ISDN communications

By Elisabeth Horwitt

This December, $3.4 billion fast-food giant McDonald's Corp. will abandon its safe and secure Centrex service for a pilot communications system employing the still-evolving standard, Integrated Services Digital Network.

"The value of information as a strategic asset is increasing rapidly for us," notes McDonald's telecommunications director Patrick Krause. He was a member of the management team that two years ago evaluated the company's voice and data communications systems, assessed future needs and developed a proposal that led to the ISDN pilot test. "Ideally, ISDN will allow us to install one uniform wiring plan and switching vehicle for network access," Krause says.

The emerging ISDN telecommunications standard defines a single set of specifications that will enable digitized voice, data, image and text transmissions to be delivered to the same user terminal over the same channel.

Krause

In addition to uniformity, Krause says, McDonald's hopes to realize substantial savings in equipment, line and service costs by consolidating its transmission facilities under ISDN services supplied by Illinois Bell.

Currently, the company uses a wide variety of switches, controllers, modems and cables to connect data terminals to Wang Laboratories, Inc., IBM and Unix-based hosts; telephone sets to public and dedicated lines; and workstations to data transmission services such as value-added networks, Digital Dataphone Service and WATS.

"We were concerned with long-term viability," Krause says, explaining why McDonald's decided that its 10-year-old telecommunications system was overdue for an overhaul. Although Illinois Bell's Centrex had served them well in the past, he says, McDonald's had become aware of the

See **FAST-FOOD** page 12

NEWSPAPER

Pan Am exploring DP sharing with American Airlines group

By David A. Ludlum

NEW YORK — Pan American World Airways, Inc. is looking into expanding its cooperation with American Airlines, Inc. in data processing in the wake of Pan Am's agreement to use American's Sabre reservation system.

Pan Am is comparing American's data processing capabilities with its own in weighing further cooperation, according to Robert Wagner, Pan Am's general manager of data systems and communications.

The airlines limited the scope of the Sabre agreement in order to expedite it, Wagner said. The agreement calls for Sabre to provide Pan Am's seating reservations and departure control. It does not cover Pan Am's freight tracking or reservations that Pan Am manages for several Latin American airlines.

In announcing the Sabre agreement late last month, Pan Am Chairman C. Edward Acker said Pan Am will "review other areas in which American's data processing resources could augment Pan American's capability in . . . operational and analytical functions."

Reason for move

Wagner said the chief reason for the move to Sabre is its penetration in travel agents' offices. Terminals for Sabre, the largest of five major airline reservations systems in the U.S., sit on 48,000 travel agents' desks, generally under exclusive five-year contracts, he said. The system issues more than half the airline tickets sold in the country, Wagner said.

Pan Am spokeswoman Ann Whyte said the number of terminals for Pan Am's Panamac reservations system on agents' desks is "very, very small."

Sabre already carries listings for Pan Am and other major airlines. The new agreement provides for Pan Am's seating availability, fares and schedules to be reported in real-time, which is not now the case, Wagner said. "If one seat is available, you get it," he said.

Benefits for Pan Am

The move also will allow Pan Am to provide customers with boarding passes when they make reservations, automatically record mileage accumulated in frequent-flyer programs and offer other travel services, Acker said.

Panamac is 22 years old and was rewritten in 1973. It was derived from the Programmed Airlines Reservation System application software developed by IBM and uses the ACP/TPF operating system and an IBM 3083 Model BX host processor, Wagner said. He would not say how many workers are involved with the system.

Pan Am hardware and data processing personnel freed up by the move to Sabre will be used to solve other needs where capacity is lacking, including decision support, electronic mail, maintenance and engineering, Wagner said. Pan Am reservation agents will continue to use the Panamac terminals, according to Wagner.

Pan Am said no personnel will be laid off due to the move to Sabre, but a day after announcing the Sabre agreement it said it was laying off 212 of its 1,470 reservations agents because of a decline in business. That decline is because of concern with terrorism in Europe and the Middle East, Wagner said.

In announcing the Sabre agreement, Pan Am and American also said they will integrate their frequent-flyer programs, allowing mileage accumulated under one program to be credited to the other, effective June 1.

Tandem unveils workstations

PC AT compatibles emulate 6530 terminals

By Jeffry Beeler

CUPERTINO, Calif. — In a move to strengthen its distributed processing capabilities, Tandem Computers, Inc. today is set to introduce two IBM Personal Computer AT-compatible workstations that reportedly support Tandem's key communications software products.

Even though both the 6AT/20 and 6AT/40 can operate in a stand-alone mode, they are primarily intended to serve as system terminals and to be integrated into networks that incorporate Tandem's Nonstop mainframes.

In addition to being configured with a program that allows micros to emulate a Tandem Model 6530 terminal, the 6AT/20 and 40 support the vendor's Information Xchange Facility (IXF) software, according to John Gully, manager of product management at Tandem's Austin, Texas, site.

Together, 6530 emulation and IXF reportedly enable the workstations to connect to Tandem hosts through standard access methods and make the two 6ATs compatible with the firm's Pathway transaction processing system.

Distributed processing

One key to the workstations' distributed processing capabilities is their local intelligence and storage capacity. Both units use Intel Corp.'s 80286 microprocessor and support an array of operating systems, including Microsoft Corp. MS-DOS 3.1, Unix and its look-alike — Microsoft's Xenix. The units are expandable to 11M bytes of main memory and 80M bytes of external storage.

A basic 6AT/20 incorporates a 20M-byte disk system and costs $3,995, compared with $4,495 for a minimum 6AT/40, which provides 40M bytes of mass storage.

Both products are available for immediate delivery.

In this issue

NEWS

Thinking Machines Corp. unveils Connection Machine, a massively parallel processor with great potential for solving large data problems/ **4**

Computervision aims to overcome drop in revenue and market share with new CAD/CAE workstation, slated to be company's flagship product/ **5**

Users greet NCR's just-announced Model 9800 mainframe with mixed reviews, characterizing the machine as too slow to satisfy even their current processing needs/ **6**

See Page 16

Compatibility problems arising from piecemeal purchases bar users from local net implementation, Zenith's president tells Comdex crowd/ **8**

Corporate customers still said to be successfully wooed by major computer chains, despite tumult in micro reseller channel and predictions of vendor shifts to direct sales/ **8**

NAS unveils upgradable version of 7380 disk drive and discount plan for disk drive customers/ **10**

Amid third-party grumbles over DEC decisions allegedly easing them out of new VAX products market, DEC users attend Dexpo South '86 looking for components and software/ **14**

Conventional corporate accounting fails to reflect full benefits of automation and can steer companies away from valuable investments, leading business professors tell national gathering of accountants/ **15**

DEC introduces low-cost, downsized monochrome workstation and cuts prices of two other models in Vaxstation family/ **15**

MICROCOMPUTERS

High among applications of Ashton-Tate's Dbase is an antidrug battle in Florida, thanks to innovations by Department of Law Enforcement special agent/ **19**

Micro data base software firms continue to take shots at Dbase, but market stress may take its toll/ **19**

COMMUNICATIONS

Telecommunications investments grow as user companies scramble to fill niches created by convergence of computer and communications products/ **31**

TRW's Information Networks Division signs OEM agreement to resell Banyan products as part of networking product line/ **31**

SOFTWARE & SERVICES

MSA Chairman and CEO John Imlay tells *Computerworld* why his firm will withstand IBM competition and face continued demand for MSA products/ **37**

Rabbit announces four contracts for IBM SNA connectivity software products, including deal with IBM/ **37**

SYSTEMS & PERIPHERALS

The first Data General MV 20000 and MV 2000DC superminicomputers hit marketplace/ **43**

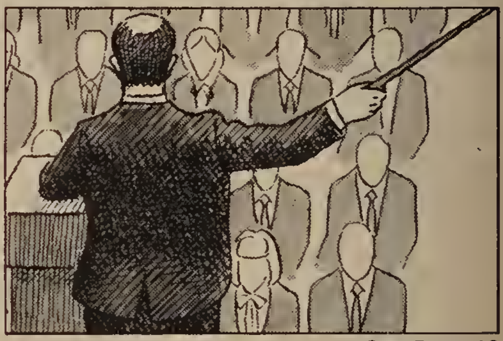
Britton Lee, Inc. announces upgraded processor board for IDM 500 series of relational data base machines/ **43**

COMPUTER INDUSTRY

IBM CEO John Akers warns of "demanding year ahead" in address to shareholders/ **142**

DEC's Kenneth Olsen says many industry problems stem from tax laws encouraging corporations to purchase computers in excess of their needs/ **142**

EXECUTIVE REPORT



See Page 49

Managing end-user training: Companies can gain by placing training, application development and end-user support under one roof. By Sharon Efroymson/ **49**

IN DEPTH

Upgrading as high-yield PC expansion path: Users tempted to scrap old IBM Personal Computers for Personal Computer ATs should weigh "slight" incompatibilities of 80286-based AT against powerful, reasonably-priced expansion boards and disks. With these upgrades, users can hold out for arrival of 80386. By T. A. Elkins/ **65**

OPINION & ANALYSIS

Wohl on IBM's approach to office automation/ **17**

Bender on Lotus' Human Access Language add-on for 1-2-3/ **19**

Silverstein on mixing packet-switching and SNA/ **31**

Warner on Ada's future outside the Defense Department/ **37**

Connolly on growth of transaction processor market/ **43**

Warner on industry predictions for veterans Tandy and Apple/ **143**

DEPARTMENTS

Editorial/ 16
New Products/ 81
Calendar/ 108
Nickels & Dimes/ 117

ILLUSTRATIONS ON PAGES ONE AND 17 BY ALAN WITSCHONKE

TURBO

Why are SYBACK & SyncSort CMS the fastest things on no wheels?

(More technology in the tank!)

Call (201) 930-9700.

Arrange a test drive.

You say you've always had very simple tastes? All you ever wanted was the best?

Well, step into our showroom and kick a few tires! We'll show you two programs that are the Ferrari and Lamborghini of VM programs.

- **SYBACK – the world's fastest and most maneuverable backup, restore and copying program;**
- **Syncsort CMS – the world's fastest and most maneuverable VM/CMS sort program.**

What makes 'em so special? Well . . .

(1) TURBO PERFORMANCE: Have you ever stepped down on the gas in a dangerous driving situation and discovered . . . nothing? Well, that'll never happen to you with these two vehicles.

Both are equipped with our special brand of "software turbocharging." We call it FBT, which stands for Fluid Buffering Technique. Our competitors call it something else.

We discovered FBT one dark and rainy night when we were trying to find a way to speed up the movement of data in sort programs. After crying "Eureka," we applied it to our OS and DOS sort programs. The results were . . . wow!

Now we've carried that bright idea over into VM dump-restores and sort programs. And the results are still wow! Compared to any other backup or sort program clogging the nation's VM thruways today, SYBACK and SyncSort CMS will save you up to:

- **50% in Elapsed Time;**
- **45% in VTime;**
- **55% in TTime;**
- **75% in SIOs.**

So who needs all that speed? You do. If you want to optimize your VM operations, stay out of needless DP traffic jams, and make the boss happy with your throughput.

Here's what happened to one large government agency: Their backup operations used to require a full 24 hours to complete. Then they installed SYBACK. Now their backup takes — are you ready? — one-half hour!

(2) EASY HANDLING: SYBACK and SyncSort CMS are among the most flexible, user-friendly programs ever produced by anybody anywhere. That's one reason programmers love 'em. And where does it say that backup and sort operations have to be hard to be good?

(3) "MISTER SOFTWRENCH" SERVICE: We've got the best pit crew in the business. More than 85% of all customer requests are resolved within 24 hours.

If you'd like to put a little high technology in your VM tank, give us a call. We might even take your used VM dump-restore or sort program as a trade-in!

syncsort
INC.

Syncsort Incorporated 50 Tice Boulevard, CN18, Woodcliff Lake, N.J. 07675

Massively parallel processor introduced

Connection Machine concept represents a 'new technology'

By Eddy Goldberg

CAMBRIDGE, Mass. — The massively parallel processing Connection Machine introduced by Thinking Machines Corp. last week represents "a fundamentally new technology," according to company founder and President Sheryl Handler.

The Connection Machine incorporates 16,000 to 64,000 processors that reportedly process data at up to 1 billion instructions per second.

"I think it's a breakthrough, but I don't think it immediately makes other machines obsolete," said Vincent E. Giuliano, vice-president and chief scientist at Mirror Systems, Inc., which produces software systems for parent company Times Mirror Co.

"The important thing at this point is to prove the concept," said Martin Schultz, chairman of Yale University's computer science department. "We have to find out if massive parallelism is the answer to our needs," he said. Schultz is looking to simulate three-dimensional physical experiments, among other tasks.

The company, founded in June 1983, has sold six units, which cost $1 million in the 16,000-processor configuration and $3 million for the full 64,000-processor version.

The first sale was to the Defense Advanced Research Projects Agency (DARPA), which sponsored the project to develop a general-purpose massively parallel computer.

"Each of the architectures we're sponsoring represents a major architectural advance," said Stephen Squires, assistant director of DARPA's Information Processing Technology Office. "This is pushing things in the direction of fine-grained, massively parallel, fully connected computing," he added.

Fine-grained processing assigns each data element of a task to an individual processor, allowing thousands of processors to work simultaneously, the company said. It works best where the number of data elements is large, ranging from 10,000 to one million.

The front end is a conventional computer, such as a Digital Equipment Corp. VAX or a Symbolics, Inc. 3600, which contains the programs. Any single-data-element instructions are executed directly by the front end. Instructions that call for operations on the whole data set at once are passed to the Connection Machine for execution.

For problems with more than 16,000 or 64,000 data elements, the processors, which each have 4,096 bits of memory, act as virtual processors. The Connection Machine can support up to one million virtual processors.

Its communications technology, called the router, has an overall capacity of 3 billion bit/sec. and allows any processor to establish a link to any other processor in a maximum of 12 dynamically configurable steps. Though its future usefulness is yet to be fully determined, four applications were demonstrated: document retrieval, fluid dynamics modeling, creating contour maps from aerial photographs and the design of very large-scale integrated circuits.

Rolm voice linked to VM

From page 1

"This is the first link between voice messaging from Rolm and an IBM office system," said Jeff Crow, group product manager of Rolm's messaging products division. "We believe that voice and text mail are complementary; bringing them together benefits users."

One such benefit, Crow said, is that Profs users will receive notification of waiting Phonemail messages directly on their screens. They can also bring up a list of waiting calls that includes details such as caller name and time of day.

"The actual features being provided are less important than the fact that this announcement represents a first, small but important step toward true integration of Rolm voice and IBM data systems," said Susan Lehto, senior research analyst at Boston-based consulting firm the Yankee Group.

"You wouldn't want to rush out and buy this stuff unless you already had most of the necessary components," Lehto added. Those components, she said, include IBM's VM/SP Release 3; IBM's Voice Text Messaging System (VTMS), which is priced at approximately $10,000; a Phonemail system, which costs $40,000 or more; and Voicemail/VM, which is priced at $2,000 and up. VTMS can be used as a text messaging system or as part of the link between Phonemail and Profs.

"Dual message notification is a small feature," Lehto said. "The next step would be having voice messages delivered to the user's terminal, either on the screen or in printed form or even audibly."

Available now, Phonemail/VM is said to run on any private branch exchange or Centrex system supported by Phonemail. It costs $2,000 for a four-channel PBX, $4,000 for an eight-channel PBX, $6,000 for 16 channels and $2,000 for each additional add-on of 16 channels.

A second Rolm introduction was the latest release of Phonemail, which includes a number of new features, including the following:

- Name/extension identification, which enables users to identify a message recipient by last name instead of by extension.
- Multiple personal greetings, which allows users to set up two alternate messages for callers. For example, internal callers might hear one message, callers from outside, another. This feature is only available with Rolm CBXs.
- Personal distribution list, which sets up one number to send voice mail to a group of Phonemail boxes. Abbreviated prompts allow experienced users to use shorter versions of Phonemail commands.

The new version of Phonemail is automatically included with all new Rolm voice messaging systems, as of today. It also is available as an upgrade to currently installed systems. The upgrade is priced the same as Phonemail/VM.

TOP OF THE NEWS

NEWS from page 1

the entire vendor exposition, and moved the remaining educational conference to a much smaller site.

■

A small computer platform and an office networking software system are due to be announced by Honeywell early next month. Top Honeywell executives are scheduled to be on hand in New York as the company emphasizes its commitment to the office market and outlines its strategy for the office and departmental systems arena.

■

Software Publishing Corp. will announce today it has signed a letter of intent to acquire a full-function desktop publishing product being developed by Best Info.

Second-class postage paid at Framingham, Mass., and additional mailing offices.

Computerworld (ISSN-0010-4841) is published weekly, except: January (5 issues), February (5 issues), March (6 issues), April (5 issues), May (5 issues), July (5 issues), August (5 issues), September (6 issues), October (5 issues), November (5 issues), and a single combined issue for the last week in December and the first week in January by CW Communications/Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171.

Copyright 1986 by CW Communications/Inc. All rights reserved.

Computerworld can be purchased on 35 mm microfilm through University Microfilm Int. Periodical Entry Dept., 300 Zeeb Road, Ann Arbor, Mich. 48106. *Computerworld* is indexed: write to Circulation Dept. for subscription information.

PHOTOCOPY RIGHTS: permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by CW Communications/Inc. for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $3.00 per copy of the article, plus $.50 per page is paid directly to Copyright Clearance Center, 21 Congress Street, Salem, Mass. 01970.

Permission to photocopy does not extend to contributed articles followed by this symbol. ‡

Special requests for reprints and permissions only should be addressed to Nancy M. Shannon, CW Communications/Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171. Subscriptions call toll free (800) 544-3712 or (215) 768-0388 in Pennsylvania.

Subscriber rates: $2.00 a copy; U.S. — $44 a year; Canada, Central & So. America — $110 a year; Europe — $165 a year. all other countries — $245 a year (airmail service). Four weeks notice is required for change of address. Allow six weeks for new subscription service to begin.

ABC ABP

POSTMASTER: Send Form 3579 (Change of Address) to *Computerworld*, Circulation Department, P.O. Box 1016, Southeastern, PA 19398-9984.

COMPUTERWORLD

Publisher
Donald E. Fagan

Editor in Chief
Terry Catchpole
Executive Editor
Sharon Frederick

News Director
Peter Bartolik
Senior Editors
Eric Bender, Microcomputers
James Connolly, Systems
Clinton Wilder, Industry
Elisabeth Horwitt, Communications
Charles Babcock, Software
David Ludlum, Management
Senior Writers
Donna Raimondi
Rosemary Hamilton
Eddy Goldberg
Douglas Barney
Stanley Gibson
David Bright
New Products Editor
Suzanne Weixel

Features Director
George Harrar
Senior Editors
Janet Fiderio
Glenn Rifkin
Associate Editors
Amy Sommerfeld
Becky Batcha
Barbara Wierzbicki
Assistant Editor
Deborah Fickling
Senior Writer
Michael L. Sullivan-Trainor

Managing Editor
Donovan White
Chief Copy Editor
Charlotte Ziems Donaldson
Assistant Chief Copy Editor
Patricia Heal Erickson
Copy Editors
Julie Cook
Penny Janzen
Susan Miller
Kelly Shea
Steven M. Ulfelder
David W. Bromley

Design Editor
Marjorie Magowan
Graphics Editor
Mitchell J. Hayes
Graphic Designer
P. Charles Ladouceur

Assistant to the Editor in Chief
Parth Domke
Editorial Assistants
Patricia Faherty
Christie Sears
Nancy Shannon
Linda Gorgone
Laura Fredrickson

News Bureaus
Mid-Atlantic
201/967-1350
Alan Alper, Correspondent
Washington, D.C.
202/347-6718
Mitch Betts, Correspondent
Southeast
404/394-0758
James A. Martin, Correspondent
West Coast
415/328-8064
Jeffry Beeler, Chief
Maura McEnaney, Correspondent
Peggy Watt, Correspondent

Computerworld News Service
Susan Blakeney, Director
Edward Warner, Editor

Main Editorial Office
Box 9171, 375 Cochituate Road,
Framingham, MA 01701-9171 617/879-0700

Computerworld is a member of the CW Communications/Inc. group, the world's largest publisher of computer-related information. The group publishes over 50 computer publications in more than 20 major countries. Nine million people read one or more of the group's publications each month. Members of the CWCI group contribute to the *Computerworld* News Service, a daily on-line service offering the latest on domestic and international computer news. Members of the group include: ARGENTINA'S *Computerworld/Argentina;* ASIA'S *Asian Computerworld;* AUSTRALIA'S *Computerworld Australia, Australian PC World* and *Macworld;* BRAZIL'S *DataNews,* and *PC Mundo;* CHINA'S *China Computerworld* and *China Computerworld Monthly;* DENMARK'S *Computerworld/Danmark, PC World* and *Run (Commodore);* FINLAND'S *Mikro;* FRANCE'S *Le Monde Informatique, Golden (Apple), OPC (IBM), Theoreme* and *Distributique;* GERMANY'S *Computerwoche, Infowelt, PC Welt, Computer Business,* and *Run;* ITALY'S *Computerworld Italia* and *PC Magazine;* JAPAN'S *Computerworld Japan;* MEXICO'S *Computerworld/Mexico;* THE NETHERLAND'S *Computerworld Netherlands* and *PC World;* NORWAY'S *Computerworld Norge* and *PC Mikrodata;* SPAIN'S *Computerworld Espana, PC World* and *Commodore World;* SWEDEN'S *ComputerSweden, Mikrodatorn,* and *Svenska PC World;* SWITZERLAND'S *Computerworld Schweiz;* THE UNITED KINGDOM'S *Computer News, PC Business World,* and *Computer Business;* VENEZUELA'S *Computerworld Venezuela,* the U.S. *Amiga World, Computerworld, inCider, Infoworld, MacWorld, Micro Marketworld, PC World, Run, 73 Magazine, 80 Micro, Focus Publications* and *Network World.*

Computervision launches flagship CAD/CAE Caddstation

Firm has no plans to sell Cadd 4X software alone

By Rosemary Hamilton

BEDFORD, Mass. — Aiming for a new lease on life after a year of declining market share, Computervision Corp. last week rolled out a workstation-based computer-aided design (CAD) and computer-aided engineering (CAE) system slated to become the firm's flagship product.

But while the new Caddstation won positive initial reviews, some observers questioned the company's strategy of not making its proprietary software available on a wide range of other vendors' hardware.

Meanwhile, Computervision posted improved financial results for the first quarter ended March 31 that showed the company still operating at a loss. Computervision reported a net loss of $7 million, or 24 cents per share, on revenue of $112.9 million. In the first quarter last year, the company reported a net loss of $18.8 million, or 66 cents per share, on revenue of $105.9 million.

Caddstation will be sold as a complete system, and Computervision does not plan to sell unbundled Cadds 4X software to non-Computervision workstation users as some analysts have urged.

Furthermore, a company spokesman said that even if Cadds 4X were supplied to non-Computervision users, it would not work well without the Computervision-designed Graphics Processing Unit (GPU) that was incorporated into the Sun Microsystems, Inc. hardware used to build Caddstation.

" It wouldn't be as powerful or as integrated without the GPU," spokesman Thomas Charland said.

"This is a real sticky point," said Vicki Brown, a senior analyst at International Data Corp. in Framingham, Mass. "By not unbundling the software, they've yielded a product by which the software can only run on Computervision systems."

Large number of Cadds 4X devotees

However, Computervision has a large installed base of Cadds 4X devotees who are willing to buy complete systems, analysts predicted.

"A good portion of the installed base will buy Caddstation," said Laura Conigliaro, a vice-president at Prudential Bache Securities, Inc. in New York. "They continue to buy the older systems with Cadds on them."

Dana Lonn, CAE manager at lawn equipment manufacturer Toro Co. in Minneapolis, said his department was a beta site for Caddstation. "Generally, it's a very good system," he said. "It needs a little development work to get it where it should be, but I'm convinced they're committed to do that."

Lonn said the response time on his 8M-byte color workstation is not as quick as he expected, particularly when he is working with the accompanying tablet to input data.

Caddstation is based on a Sun 32-bit workstation operating under the University of California at Berkeley 4.2 version of the Unix operating system. It comes with either a Motorola, Inc. 68010 or 68020 microprocessor, a 68881 floating-point processor and the proprietary GPU graphics coprocessor.

The stand-alone version comes with 4M bytes of main memory, expandable to 12M bytes and 85M bytes of disk storage, with the option of adding another 85M-byte disk. Users can purchase either a monochrome monitor or 1,152- by 900-pixel, 19-in. color monitor.

The system can also be used as either a diskless node or a file server on a network and can be configured as a host for up to six Caddstations. Computervision officials refused to release specific prices but estimated that a typical color Caddstation, running its mechanical CAD software, will cost approximately $65,000 and that a diskless node will sell for about $14,000.

Computervision also announced the Caddsnetwork, an Ethernet-based network supporting the Transmission Control Protocol/Internet Protocol (TCP/IP), that will provide Caddstation access to both Digital Equipment Corp. and IBM systems that support the protocol as well as older Computervision systems such as its CDS-4000.

The first portion of the Caddsnetwork will be a local-area network to link Caddstations with the Sun Microsystems Network File System, which allows users to transfer data among different systems. The company said a backbone network supporting the TCP/IP protocol will be available this summer.

Caddstation is the result of a three-year effort in which the company ported its Cadds 4X computer-aided design and manufacturing (CAD/CAM) software from its proprietary systems to one based on an industry standard platform. Some of the company's troubles last year resulted from its proprietary systems losing market appeal.

"It can't help but be a boost," said Charles Foundyller, president of Daratech, Inc., a CAD/CAM market research firm in Cambridge, Mass. "The installed base will be very happy with it. It's attractive-looking and has good user interfaces."

THE 5th GENERATION

For more than 4 Generations, our FDR DASD Management System has helped more than 5000 users to maximize system productivity. Now we've created a 5th Generation product that significantly enhances FDR's speed, flexibility and ease of use.

FDR Ver. 5.0 is a complete DASD Management System. Data Set backups can be automated (automatically creating a backup when updated). Data Sets which have not been referenced for a period of time can be moved to a cheaper medium. FDR will automatically RECALL the Data Set when it is referenced by a TSO or BATCH user.

- The new performance option reduces the backup time by up to 50%.
- The Data Compression option cuts the size of the backup in half.
- COMPAKTOR can release unused space on a volume without a backup in seconds.
- And much more . . .

Available for IBM MVS and MVS/XA.

For further Information
or Free 90 Day Trial, Call or Write . . .

INNOVATION
DATA PROCESSING
970 Clifton Ave., Clifton, NJ 07013 • 201—777-1940

Speed, small memory among few criticisms of NCR 9800

Users generally pleased with fault-tolerant effort

By Jeffry Beeler

PHOENIX — Some potential buyers of NCR Corp.'s just-announced Model 9800 mainframe last week characterized the machine as too slow to satisfy even their current, much less their future, processing needs.

At least a few user complaints were also triggered by the 9800's failure to expand NCR's memory address space beyond its current 8M-byte limit.

Otherwise, though, NCR's first venture into fault tolerance and on-line transaction processing won generally rave reviews from members of the international Federation of NCR User Groups. The members were in town last week for the 16th annual NCR Users Conference (Nucon), which marked the 9800's first public demonstration since its introduction April 22.

"I'm quite excited about the product's fault-tolerant features, which are fantastic and signal a whole new direction for NCR," said Lawrence Staples, programming vice-president at Appleton, Wis.-based Valley Systems, Inc.

Although the 9800 uses a significantly enhanced version of the operating system that drives NCR's previous mainframes, most users foresee little hardship in porting their existing files and application code to the company's fault-tolerant architecture.

"Migration path engineering is one of NCR's traditional strengths," Staples said. "Users may not always get the performance they want when they move their software from one generation of NCR system to the next. But at least the programs always continue to run."

A similar faith in the vendor's migration prowess was voiced by Homer Schmitz, senior vice-president for management resources at St. Louis-based Deaconess Hospital. "Over the years, we've gone through several generations of NCR hardware," Schmitz recalled. "Every time we upgraded to a new processor model, we had a pure transport of software."

Baker Manufacturing Co. of Evansville, Wis., is also a seasoned veteran of NCR mainframe swapping. "In 1971, we started with a Century 100," explained Baker's MIS manager, Robert Richter. "Later, we became one of the first 50 users of NCR's Criterion 8550." In the end, Baker upgraded to an 8560 and then to an 8575 Group 2, which the company still uses.

His company's earlier successes in graduating to new, enhanced mainframes has convinced him that code residing on existing NCR systems can be ported to the 9800 with little rewriting. "But to get the full benefit of the machine's native performance, the software will have to be recompiled," he said.

User reaction not all upbeat

Reaction to the latest NCR mainframe announcement, however, was far from universally upbeat. Staples of Valley Systems, for example, found fault with the computing horsepower of the 9800's application processors, each of which roughly equals the performance of an NCR 8555 Group 2.

Staples expects the company to increase its fault-tolerant machine's processing speed through the addition of improved technology. But until then, the 9800's current throughput "simply won't be adequate for my work load," he said.

Cincom facing relational test

From page 1

matched or bested IBM's market-leading DB2 product on most of the 12 points in Codd's controversial relational quality scale [CW, October 14, 21, 1985].

The initial MVS version of Supra, announced last fall, has been available since Feb. 17. A DOS version will be available June 1. The new release of Mantis, 4.2, was announced and will also be available June 1.

Speaking at the Cincom meeting was Codd's associate C. J. Date, a partner in the Research Institute, who cited three specific points on which his group considered Supra to be superior to DB2. These were referential integrity, primary keys and foreign keys.

Date criticized the lack of referential integrity in DB2, while calling it "one of the strongest points about Supra."

Referential integrity is a relational property that allows the system to enforce rules on whether one set of data can be used with another. "We have a rule you cannot enroll a student who has not been admitted," noted J. Rich Burnett, data base administrator for Alabama's Auburn University. Auburn is one of a handful of early users of Supra, and Burnett said, "referential integrity is built into the system. It will enforce those rules."

Date said referential integrity can be added to DB2 on an application-by-application basis, but it is a job for a skilled programmer. The other points Date mentioned were primary keys, which identify records and represent fields within those records, and foreign keys, which tie one record to another through its primary key.

The full preliminary results of the Codd study were not made generally available, but were related to users. "Supra appeared higher on each count than DB2," recounted Ray Parham, data base administrator of Akzo America, Inc., an Asheville, N.C., holding company, who attended a closed-door briefing on the study by Cincom officials.

Other sources tempered claims that Supra was being rated higher on many counts, saying Supra's alleged superiority was limited to one or two areas. A McDonnell Douglas Corp. representative said, "It's the tools tied to Supra that make it look better. I don't think it's a lot better."

Nevertheless, Cincom customers were eager to see final results of the study. It is scheduled to be published sometime this summer, Cincom officials said.

"I think Supra has got a great architecture," said Neal Indermuhle, data base administrator for J. M. Smucker Co., the Orrville, Ohio, food processor, who said he would like to see his firm move from Supra's predecessor, Cincom's TIS data management system, to the new system.

A Frankfurt engineering firm, Lurgi, has installed Supra and conducted tests with it for four weeks to compare its performance with DB2 and IBM's IMS. Andreas Ohuserge, Lurgi director of data base implementation, said in one instance an application designed to take advantage of relational properties ran 1.7 times faster on Supra than on the IMS version. He cautioned that the test reflected "special circumstances" and was not a head-to-head comparison.

A powerful one-two punch

Conference attendees said a new release of Mantis, Cincom's fourth-generation development language, coming at the same time that Supra hits the marketplace, will give the firm a powerful one-two punch.

Release 4.2 features screens that are 255 col. by 255 rows, compared with the 80-col. by 24-row limitation in the previous release and that offer full screen editing, compared with single-line text editing in the previous release.

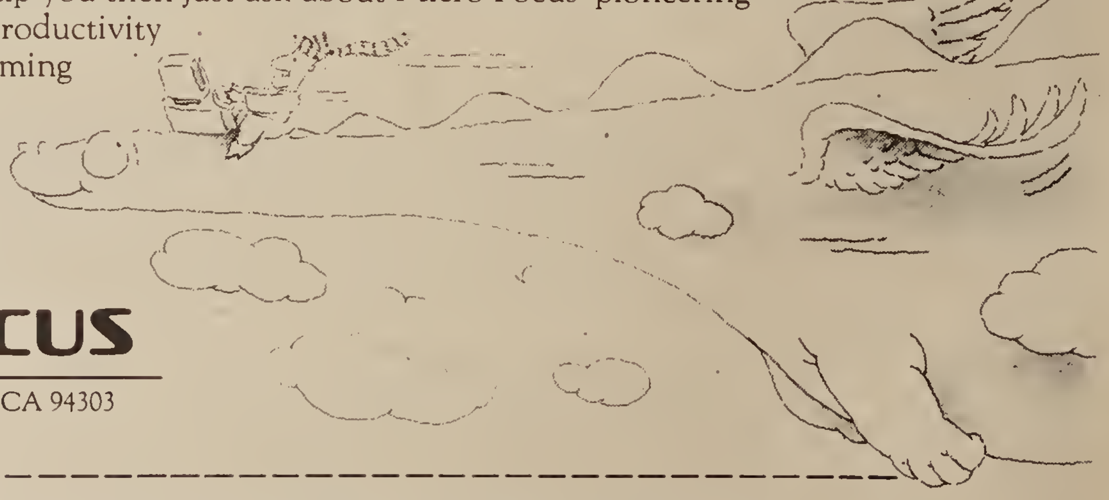
Many attendees worried over how much both new products would draw down their mainframe resources.

John F. McKeown, telecommunications programmer for Signode Industries, Inc. of Glenville, Ill., said he had been told by Cincom officials that the new release of Mantis increased CPU demand by 30% but the increase could be trimmed through high-performance options that would improve performance 24%.

The options include binding and global pools. Binding allows a Mantis program to hold more information about what it has just done in the mainframe random-access memory (RAM), saving disk access time. Global pools is the name of a tracking system that watches what common routines are resident in memory at the same time. When a production application calls for a particular routine, the CPU retrieves it from another application in RAM rather than from the disk.

Without the high-performance options, Release 4.2 "will probably run a little slower," said Thomas McLean, Cincom's vice-president for marketing and product planning.

Mantis 4.2 will go to current users as a free upgrade and will be sold to new customers for $30,000 to $80,000. When purchased together, the DOS version of Supra and Mantis will sell for $193,000 and the MVS version for $274,000.



The COBOL dinosaur flies...

...some people compare COBOL and its applications to a dinosaur. Well Micro Focus has succeeded in putting wings on the dinosaur and now he's entered a new generation. If you'd like to know how the new dinosaur can help you then just ask about Micro Focus' pioneering range of powerful compilers, productivity tools and integrated programming environments, such as VS COBOL Workbench– and then watch your productivity take off!

MICRO FOCUS

2465 East Bayshore Road, Palo Alto, CA 94303
Telephone: (415) 856-4161

CW5/5

Yes, I'm interested in the widest range of development products for PCs.
Single-user____ Multi-user____ PC DOS____ Unix____ Other____

Programmer Workstations:
☐ VS COBOL Workbench
☐ Professional COBOL

Compilers:
☐ VS COBOL Compiler
☐ VS COBOL for Unix
☐ High Performance Level II COBOL
☐ Level II COBOL/ET
☐ Mac COBOL

Development Tools:
☐ ANIMATOR
☐ FORMS-2
☐ CO-Graphics
☐ CO-Maps
☐ CO-Math
☐ micro/SPF

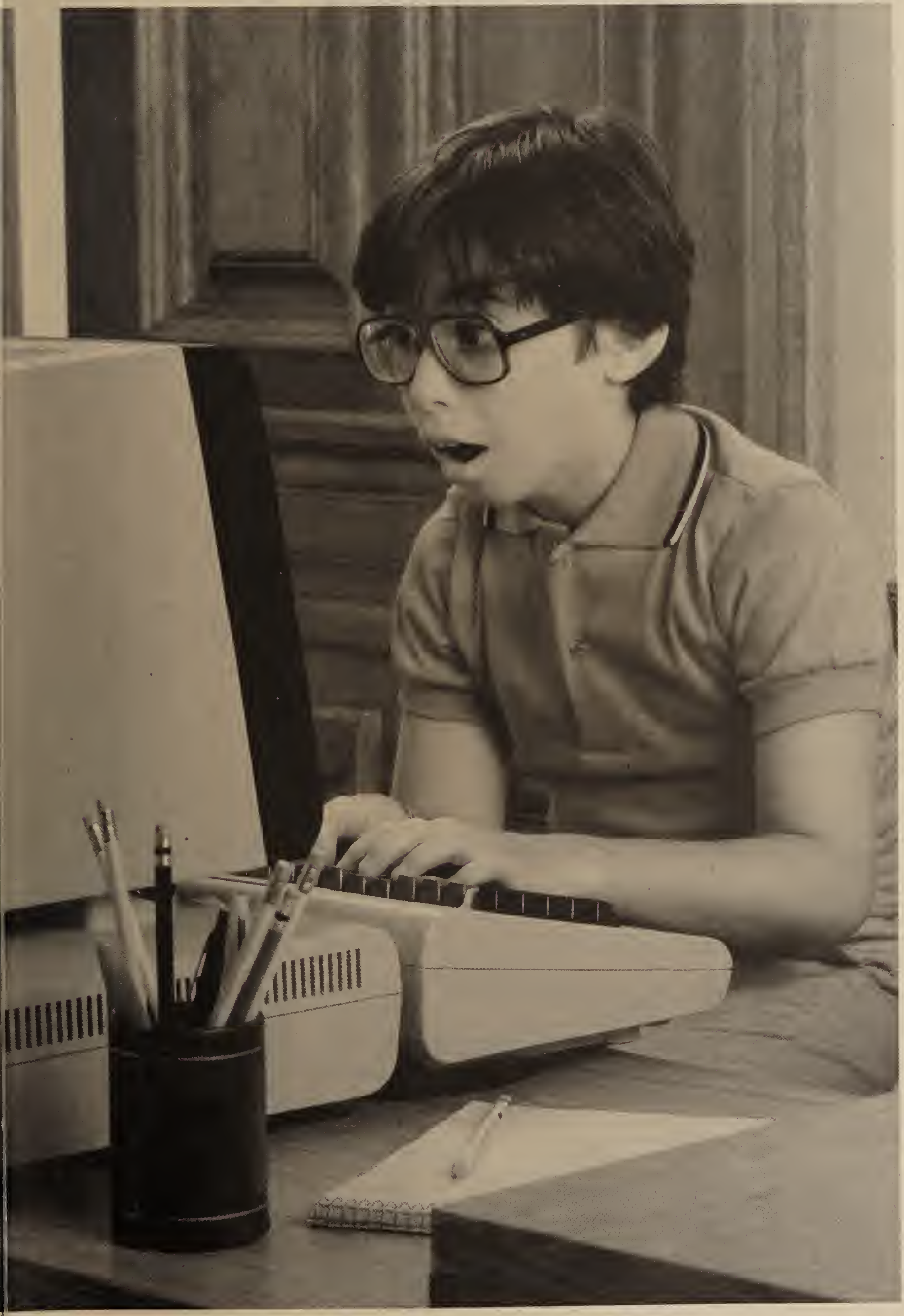
Application Generator:
☐ Sourcewriter

Name____
Title____ Phone____
Company____
Address____
City____ State____ Zip____

Send to: Micro Focus Inc., 2465 East Bayshore Road, Palo Alto, CA 94303

Level II COBOL, VS COBOL Workbench, ANIMATOR, FORMS-2, Professional COBOL, CO Maps, Mac COBOL and CO-Graphics, are trademarks of Micro Focus Limited. micro/SPF is a registered trademark of Phaser Systems Inc. Sourcewriter is a trademark of Softwright Systems Limited

WHEN THE BOSS'S KID STARTS REWRITING THE FINANCIALS, WHAT'S YOUR DEFENSE?



VMCENTER:

THE ONE INDISPENSABLE SURVIVAL TOOL FOR VM DATA CENTER MANAGERS.

Breaking into your online system isn't supposed to be child's play. But all too often, it is.

Unless, of course, you have VMCENTER.

VMCENTER is the one comprehensive system that addresses all your key concerns as manager of a VM data center. And none of those concerns is more important than the security of your system and data.

That's why VMCENTER provides multiple authorization levels—for maximum control over system usage.

It's also why we've designed VMCENTER to make it easy for you to customize your protection to meet specific needs. You can change passwords in a flash, encrypt data through simple commands, and use on-line reports to keep top management informed of potential security problems *before* they happen—not after.

But if you think VMCENTER is great for security, you should see what it does for disk and tape management, resource scheduling, workload balancing, and system accounting. In one stroke, VMCENTER eliminates all your biggest headaches. And does it in an integrated manner that's more effective than any possible collection of quick fixes.

VMCENTER. It's not much fun for the boss's kid. But it can be a lifesaver for his dad—and for you.

For more information on VMCENTER, call or write VM Software, Inc., 2070 Chain Bridge Road, Suite 355, Vienna, Virginia 22180, telephone **(703) 821-6886.**

VM
SOFTWARE INC.

1-CWX-0586

Resellers strengthen ties with customers

Toshiba transportable, optimism of business chains highlight Comdex

By Eric Bender

ATLANTA — Despite tumult in the micro reseller channel and predictions of a vendor shift toward direct sales, major computer chains are solidifying their position among corporate customers. This was the consensus of both vendors and resellers interviewed at last week's Comdex/Spring '86 trade show.

While Lotus Development Corp. continues to beta-test various distribution options for large customers — including electronic distribution, on-site copying and others — "many of the reseller channels have rationalized to the point where they can handle that distribution more cost effectively, in many cases, than the customer or Lotus," Marketing Vice-President Michael Kolowich told *Computerworld.*

"Many large customers are sort of unraveling some of their PC support efforts," commented Alan Hald, chairman of Microage Computer Stores, Inc., a franchise operation with almost 170 outlets. "They only do those efforts from necessity."

"Customers say, 'We've been spending the last two years trying to get out of that business,' " Kolowich agreed.

Surviving dealer chains will be strengthened by their ability to draw on additional financing, suggested Rod Canion, president of Compaq Computer Corp., at a Comdex press conference. "The consolidation continues, but there are not any significant dealers shaking out," Canion said.

That was the good news for resellers and perhaps for their corporate customers at the annual spring edition of Comdex.

Decline in exuberance

The show exemplified the general decline in exuberance of micro-focused trade shows. While attendance held steady with previous years' spring gatherings at about 40,000, there were very few splashy receptions and no dramatic product announcements.

In software, desktop publishing and computer-aided design packages drew considerable attention. Among more general-purpose offerings, Satellite Software International introduced the Word Perfect Library, a $129 program manager for the firm's word processing software with built-in program editor and macro facilities. General Optimization, Inc. announced What's Best Personal Version, a $149 entry-level variant of its linear programming add-on package for Lotus' 1-2-3 and Symphony.

Local-area networks were a topic of much discussion, but few network-tailored applications debuted. One of the holdups, according to 3Com Corp. Chairman Robert Metcalfe, is difficulty in resolving pricing issues. 3Com and other vendors joined in a recent study of those issues. The study reached no overall conclusions but indicated that pricing on a per-network-server basis appeals most broadly, Metcalfe said.

If there was a hot system introduction at Comdex/Spring, it was Toshiba America, Inc.'s transportable micro, an IBM Personal Computer AT-compatible system that weighs 15 pounds and carries a starting price of $4,499. The externally powered T3100 features 640K bytes of internal storage, one 3½-in. floppy disk drive and a 10M-byte hard disk drive. Toshiba targets the machine against Compaq's new Portable II.

The expected flood of AT-compatible systems did arrive. So did dozens of add-in cards, "which can be noted here in their volume and perhaps in their lack of distinguishing characteristics," commented William Coggshall, industry analyst with Market Access International, Inc.

Among peripherals, about a dozen laser printers were unveiled (see story page 22), along with an offbeat package from Eastman Kodak Co.'s Sayett Technology subsidiary that permits PC screen images to be displayed with standard overhead projectors. The $1,200 system combines controller hardware and software with an LCD panel that sits on the projector's lens and produces a high-resolution monochrome image.

While there was much talk about future systems based on the Intel Corp. 80386 chip, the first significant product introductions are not expected before Comdex/Fall '86 in November, at the earliest.

Apple Computer, Inc. skipped the show again, and its Macintosh was almost as invisible as 80386-based hardware.

As usual, various conflicting trends showed up in hardware and software pricing. Corporate Software, Inc. Chairman Morton Rosenthal predicted that the street price of both Lotus and Ashton-Tate products will climb, as those vendors have boosted pricing to resellers. System costs showed steady slippage, with a prime example being one IBM-compatible system carrying a $345 price tag (with some lengthy footnotes).

Consolidation trends also showed up in service firms, with the demise of McGraw-Hill, Inc.'s market researcher, Future Computing, Inc., the most spectacular case.

Contributing to this report were staff members Douglas Barney, David Bright, Stanley Gibson, James A. Martin, Peggy Watt and Clinton Wilder.

FCC tags 2,500 in Comdex raid

From page 1

doing is essentially instead of attaching the serial and parallel ports, we are just putting a certified I/O card in the machine," Baden said.

"The interference is actually a form of pollution. There has to be some regulation. I think the FCC might have an impossible task," Baden said.

So far the FCC has issued notices of fines to more than 80 firms that either manufacture or resell uncertified systems. Most of the fines are for $2,000, said Dan Emrick, assistant engineer in charge of the FCC's Norfolk, Va., office.

In addition, many manufacturers of low-priced IBM clones, such as Kamerman Labs, Inc. of Beaverton, Ore., have also been subject to fines and orders to stop selling the machines. Other firms cited include Compumart of Dallas, PC Source of Austin, Texas, Conroy Lapointe of Portland, Ore., and PC Connection of Marlow, N.H., FCC officials said.

But the FCC crackdown is so widespread that some firms have been fined for what they considered minor violations. For example, Kamerman Labs claims it received a $2,000 fine simply because it changed the name of a machine that Kamerman claims was already approved by the FCC.

"We were fined because we put it under our name and not the name that we purchased it under, and I have not had the time to fight it," said President Joel Kamerman. "They didn't fine us for shipping non-FCC machines, which is much worse." Kamerman has since reinstated the machine's original name.

Kamerman, however, has no real quarrel with the FCC and says he believes that the regulations are important in helping reduce interference with ambulance radio transmissions.

The FCC investigates noncompliant products by sending undercover agents into dealerships to buy computers and also formally requests machines from vendors for testing. Both the vendor and the resellers are liable for noncompliant products.

"The information by and large is based on sales and offers for sale . . . although manufacturers are also getting our attention," Emrick said.

So far users have been only mildly affected by FCC actions, but that could change as corporations increase purchases of low-price clones, and mail-order firms grab a larger share of the market. The FCC can create problems for corporations that use computers found to interfere with radio frequencies.

"First we would tell you that you had a problem, issue a citation and request that you don't use the systems. If you continue, we will issue a monetary forfeiture, and if you still continue, we will go to the attorney general's office and get a court order or a search warrant and confiscate the equipment," said Paul J. Harris, an electrical engineer with the inspection and investigative branch of the FCC.

The FCC rigidly enforces its emissions regulations because improper levels of interference with airline communications and police and fire department radios can be potentially life-threatening. Noncompliance has been increasing, the FCC said.

In 1982, some 35% of all microcomputers were uncertified. Last year the FCC estimated that some 10% were uncertified. Due to the influx of inexpensive PC clones, however, noncompliance has increased dramatically. "It is just growing too much for us to give statistics," says Emrick, who says that more than 35% of all micros currently marketed are in noncompliance.

Problems delay 'Year of the local-area net'

By Peggy Watt

ATLANTA — Personal computers are still sneaking in corporate back doors, causing piecemeal configurations that help delay the "year of the local-area network" that industry watchers have predicted for the past several years, Zenith Data Systems Corp. President Robert Dilworth said last week during his keynote address at Comdex/Spring '86.

Robert Dilworth

The other major cause for local-area networks' delay is an innate childhood characteristic, Dilworth said in his opening address: "We do not like to share our toys.

"The user has had considerable flexibility up until now," he said in a later interview. "Maybe the only time we share our toys is when Dad says we have to. The MIS director is saying, 'yes, it's time to share.' "

That approach accompanies standards being set from the top, Dilworth added.

"Many times, before a company has time to establish a standard, there are dozens of PCs, and sometimes minis, around," he said. "Some of them are compatible with each other, and some of them are unique."

Dilworth also said that the next battle in the laptop market, one of Zenith's primary areas, will be disk size, after IBM's recent introduction of the laptop PC Convertible with 3½-in. disks.

"I wasn't sure even IBM could change the standard," he said.

The industry's ever-emerging standards can only make life easier for the MIS director, Dilworth added. "If we have standards, it's easier to make a decision," because the manager is secure in the knowledge that the basic system can grow.

For vendors, he advised cooperation, a practice Zenith embraced in its several recent, sizable government agency purchases of Zenith portables. A recent military contract included wares from 25 other companies, ranging from bundled software to system parts, Dilworth said.

He cited his earlier experience at Morrow Designs, Inc., which recently filed for reorganization in bankruptcy court. "As a small company, we had the new technology, and large companies could bring in the muscle," he said. Even the unarguably successful IBM Personal Computer had "very little IBM in that product," with contributions from Intel Corp., Microsoft Corp., Tandon Corp. and others.

Blow the route slip circuit!

YES. . . Please enter my own subscription to COMPUTERWORLD — one full year (51 issues) for just $44*. And I'll receive my Desk Top Solar Calculator FREE with my paid subscription, plus the COMPUTERWORLD FOCUS issues at no extra charge. (Allow 6-8 weeks for shipment of your calculator.)

☐ Bill me. ☐ Payment enclosed. Address shown: ☐ Home ☐ Office

FIRST NAME M.I. LAST NAME

TITLE

COMPANY

ADDRESS

CITY STATE ZIP

* U.S. only

1. BUSINESS/INDUSTRY (Circle one)
- **10.** Manufacturer (other than computer)
- **20.** Finance/Insurance/Real Estate
- **30.** Medicine/Law/Education
- **40.** Wholesale/Retail/Trade
- **50.** Business Service (except DP)
- **60.** Government — State/Federal/Local
- **65.** Public Utility/Communications Systems/Transportation
- **70.** Mining/Construction/Petroleum/Refining/Agriculture
- **80.** Manufacturer of Computers, Computer-Related Systems or Peripherals
- **85.** Computer Service Bureau/Software/Planning/Consulting
- **90.** Computer/Peripheral Dealer/Distributor/Retailer
- **75.** User Other ____________
- **95.** Vendor Other ____________

2. OCCUPATION/FUNCTION (Circle one)
- **11.** President/Owner/Partner/General Manager
- **12.** VP/Assistant VP
- **13.** Treasurer/Controller/Financial Officer
- **21.** Director/Manager/Supervisor DP/MIS Services
- **22.** Director/Manager of Operations Planning/Admin. Serv.
- **23.** Systems Manager/Systems Analyst
- **31.** Manager/Supervisor Programming
- **32.** Programmer/Methods Analyst
- **35.** OA/WP Director/Manager/Supervisor
- **38.** Data Comm./Network Systems Mgmt
- **41.** Engineering/Scientific, R&D/Technical Mgmt
- **51.** Manufacturing Sales Reps/Sales/Marketing Mgmt
- **60.** Consulting Management
- **70.** Medical/Legal/Accounting Mgmt
- **80.** Educator/Journalist/Librarian/Student
- **90.** Other ____________

3. COMPUTER INVOLVEMENT (Circle all that apply)

Types of equipment with which you are personally involved either as a user, vendor or consultant
- **A.** Mainframes/Superminis
- **B.** Minicomputers/Small Business Computers
- **C.** Microcomputers/Desktops
- **D.** Communications Systems
- **E.** Office Automation Systems

321718618

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS MAIL PERMIT NO. 55 SOUTHEASTERN, PA 19398

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD

CIRCULATION DEPARTMENT
BOX 1016
SOUTHEASTERN, PA 19398-9984

Introducing

INFOGATE

The Corporate Solution For Integrating PC Software and Mainframe Information

. . . available now

Cullinet's INFOGATE is the first personal computer product to allow a wide range of different microcomputer spreadsheets, databases, word processors, and graphic software to talk to the mainframe and to each other. INFOGATE provides users of 1-2-3,™ Symphony,™ dBASE,® Multimate,™ and other software with direct access to the corporate data needed for their PC applications. For users of multiple PC products, INFOGATE also makes it possible to easily exchange data between products. INFOGATE—stand-alone or with Cullinet's Information Center Management System—it only costs $300. Call Cullinet's toll-free 1-800-551-4555 today!

Cullinet

© 1986 Cullinet Software, Inc., Westwood, MA 02090-2198

dBase is a registered trademark of Ashton-Tate, Multimate is a trademark of Multimate International Corporation, Symphony and 1-2-3 are trademarks of Lotus Development Corporation.

WANG VS/OIS USERS

HOW'S THIS?

32 COAX CABLES REPLACED BY ONE CABLE!

It's here, an entirely new multiplexer that can transmit all the data from a communications controller in your VS/OIS processor over one fiberoptic or coaxial cable to your peripherals. That's right, no more hassle of pulling bundles of dual coaxial cable through your crowded ducts ever again!

Each single coaxial cable you already have installed can now support 16 peripherals. Each WANG dual cable can now support 32 peripherals. For new installations we recommend and offer this system with fiberoptic interface.

This multiplexer is an expansion of our popular FM 1600 Cable Bandit Series of multiplexers. In one multiplexer, 16 WANG peripherals and 16 IBM 3270 peripherals can be supported over a dual cable. For both WANG and IBM 3270 devices, local data rates are maintained without any degradation in response time. Save time, space and money. Call us. We're offering fast deliveries and on-site demonstrations.

Fibronics International Inc.
325 Stevens Street
Hyannis, MA 02601
(617) 778-0700 Telex: 951297

Fibronics International Inc.
fiberoptic communications

NEWS

NAS unveils 7380 models

Can be field-upgraded to double-density versions

By James Connolly

MOUNTAIN VIEW, Calif. — Responding to what the company said was user demand for a phased upgrade path, National Advanced Systems Corp. (NAS) last week introduced new versions of its single-density 7380 disk drive.

The two 2.5G-byte drives, the 7380 Models AD and BD, can be field-upgraded to the double-density 7380 Models AE and BE (see story page 43) and can be used on the same strings as those E model versions. The previous single-density versions, the 7380 Models A4 and B4, cannot be upgraded or used in a string of D or E models but can be used with the same 7880-3 and 7880-3C controllers as the new models.

An NAS executive said the company had chosen to announce the dual-density drives without an upgrade in March 1985 because officials felt that replacing entire strings of single-density drives with double-density drives provided customers with more financial benefits and assured data integrity.

"But what the marketplace said it wanted was upgradable devices. In some cases it had to do with the Investment Tax Credit, and in some cases it had to do with the federal government saying that once they got a serial number on their books, they wanted to keep it," said Ken Page, director of peripherals marketing for NAS. He said NAS' large customers were the ones demanding upgradability.

Drives remain available

The standard A4 and B4 drives will remain available, particularly for users who want to fill out strings that already use those models and for customers who will not need a double-capacity drive during the next several years.

The AD and BD units contain dual-port electronics and four single-rotary actuator, head-disk assemblies, with each assembly accessing 630M bytes of storage. The AD costs $84,350, and the BD costs $61,225. A field upgrade from a D model to an E model drive costs $41,480. The D models, although formally announced last week, began shipments to customers in March and are available for volume deliveries now.

NAS also announced what it called its Gigabyte Discount Program, under which volume discounts for 7380 equipment will be based on the total storage capacity ordered. In the past, NAS assigned volume discount percentages to specific models. The Gigabyte Discount Program allows 8% discounts for orders of 20G to 49G bytes and 14% for orders in the 50G- to 99G-byte range.

Plug low-cost ASCII printers into your IBM 3274 with InterLynx™/3287.

InterLynx™/3287 provides an economical printer attachment to IBM direct connect 3274, remote 3274/3276/4701 controller or integrated type "A" processor adapter.

Easy optioning via a front panel menu, no internal DIP switches, serial *and* parallel interfaces, and greater diagnostic capability are standard with InterLynx™/3287.

A unique pseudo transparency option sends escape sequences to specialty printers, downloads Xerox 2700 typefonts, graphics output, bar code output, and bar code printers.

Thousands of companies worldwide use Local Data protocol converters to expand their IBM mainframe communication capabilities. Join them today.

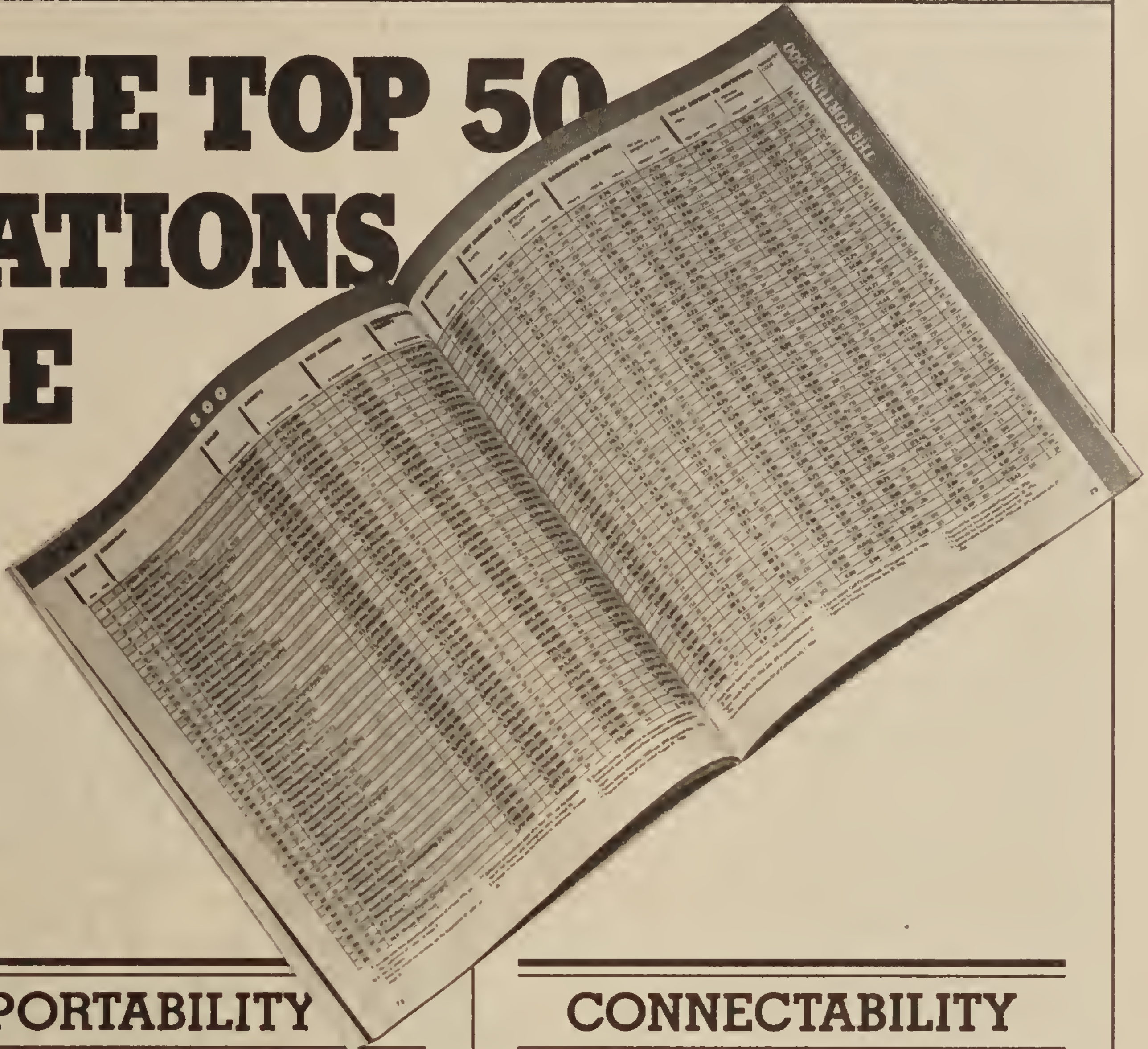
Call for more information and ask about the free 30-day trial program (213) 320-7126. In Canada call (613) 748-9751.

"Your Lynx to IBM"

LOCAL DATA
2771 TOLEDO STREET, TORRANCE, CA 90503 TLX 182518

Oracle Corporation invites you to the last DBMS Seminar you'll ever have to attend.

WHY 31 OF THE TOP 50 U.S. CORPORATIONS USE THE SAME RELATIONAL DBMS: ORACLE



COMPATIBILITY

The ORACLE® relational database management system is compatible with IBM's SQL/DS and DB2. SQL/DS and DB2 represent IBM's latest generation of database management technology for IBM's largest computers. ORACLE's capabilities and user interface — the SQL language — are identical to those of SQL/DS and DB2. Programs written for SQL/DS and DB2 will run unmodified on ORACLE.

PORTABILITY

SQL/DS and DB2 run only on IBM mainframes; ORACLE runs on IBM mainframes, DEC, DG, AT&T, HP, Stratus, Sperry, Prime, Honeywell and several other manufacturers' minicomputers, and on a wide range of microcomputers including the IBM PC/XT and PC/AT. ORACLE runs under vendor-proprietary operating systems or under UNIX™ All versions of ORACLE are identical and include a complete implementation of SQL— not a subset.

CONNECTABILITY

Having the same software running on your mainframe, minis, and micros greatly simplifies the task of connecting your machines into a network. ORACLE's network software allows microcomputer users to directly access data stored in the shared database on the mainframe or minicomputer, or copy that data into the database on their micros and operate independently.

Oracle introduced the first relational DBMS and the first implementation of SQL back in 1979. Today, the largest companies around the world use ORACLE. In fact, INC MAGAZINE ranks Oracle as the fastest-growing major software company in the USA. Surprised? Don't be. ORACLE is the number one relational DBMS, with thousands of installations on IBM mainframes, DEC, DG, HP and most other vendors' minis and micros, including the IBM PC.

To attend the next free, half-day seminar in your area or receive additional information, write Oracle Corp., Dept. CW10, 20 Davis Drive, Belmont, CA 94002, or call 1-800-345-DBMS. From now on, it's the only DBMS phone number you'll ever need.

ORACLE Seminar Schedule

AL	Huntsville	May 8
AK	Anchorage	Jun 24
AR	Little Rock	May 13
AZ	Phoenix	Jun 5, Aug 5
CA	Los Angeles	Jun 10 Jul 10, Aug 6
	Newport Beach	Jul 15
	Sacramento	May 13
	San Diego	Jun 17, Aug 7
	San Francisco	Jun 19, Aug 5
	Sunnyvale	Jun 10, Jul 8, Aug 7
CO	Denver	Jun 17, Jul 17
CT	Hartford	Jul 16
	New Haven	Aug 20
FL	Jacksonville	Aug 5
	Tampa	Aug 6
GA	Atlanta	Jul 15
IA	Des Moines	Jun 25, Aug 27
ID	Boise	Jul 31
IL	Chicago	Jun 12, Jul 8, Aug 14
IN	Indianapolis	Jun 17, Aug 19
KY	Louisville	Aug 7
LA	New Orleans	May 21, Jul 11
MA	Boston	May 13, Jun 19, Jul 16
	Burlington	Aug 12
MD	Bethesda	May 7, Jun 12 Jul 9, 23, Aug 7
ME	Bangor	Jul 3
MI	Detroit	Jun 10
	Grand Rapids	Jun 13
MN	Minneapolis	Jun 26, Jul 22
MO	St.Louis	May 14, Jun 11, Jul 30
NE	Omaha	Jul 9
NJ	Convent Station	Jun 5 Aug 7, 28
	Iselin	May 15, Jul 8, 22
NY	Albany	Jul 23
	New York City	May 14, Jun 12, 25 Jul 24, Aug 12, 26
	Rochester	May 18 Jun 19, Jul 10, Aug 13
	Syracuse	May 8, Aug 19
OK	Oklahoma City	Jun 24
	Tulsa	May 20, Aug 26
OR	Portland	May 6, Jul 24
PA	Harrisburg	Jul 8
	King of Prussia	Jul 24
	Pittsburgh	Jun 15, Aug 7
	Scranton	Aug 5
RI	Providence	Jul 8
TX	Austin	May 27, Jul 10, Aug 19
	Dallas	May 6, Jun 11, Jul 22
	Ft.Worth	Jul 15
	Houston	May 15
TX	Houston	Jun 10, Aug 19
	San Antonio	Jul 8, Aug 27
UT	Salt Lake City	Jun 5, Aug 6
VA	Norfolk	Jun 4
VT	Burlington	Aug 6
WA	Seattle	Jun 12, Jul 15
WI	Milwaukee	May 21, Jul 17

Canadian Seminars

Halifax	Aug 20
Montreal	May 14, Jun 18
Ottawa	May 8, Jun 12, Jul 10, Aug 14
Quebec	Jun 18
Toronto	May 6, Jun 3, Jul 1, Aug 5
Vancouver	Jul 10
Winnipeg	Jun 3, Aug 6

ORACLE®

Relational in the product, as well as on the label

Call (800) 345-DBMS today.

Ottawa (613) 238-2381 ☐ Quebec (514) 337-0755 ☐ Toronto (416) 362-3275
ORACLE-U.K. (SURREY) 44-1-948-6976 ☐ ORACLE-EUROPE (NAARDEN, THE NETHERLANDS) 31-2159-49344

© 1986 by Oracle Corporation. ORACLE® is a registered trademark of Oracle Corporation. SQL/DS, DB2 and IBM are registered trademarks of IBM. DEC, DG, AT&T, Stratus, HP and Bell Laboratories own numerous registered trademarks. TRBA.

Fast-food firm orders ISDN

From page 1

increasing cost of providing new terminal connections and moving equipment on Centrex. "And we wanted greater control and management of our communications system," he adds. "The phone company had been doing all of our reconfiguration and testing."

Consequently, two years ago, managers of McDonald's information systems, telecommunications and office automation came up with an 800-item manifesto describing current and future voice and data communications needs and sent out a request for a proposal embodying these details.

One of the nine companies to respond was McDonald's current Centrex-based service vendor, Illinois Bell, which offered a telecommunications solution based on the emerging ISDN networking standard.

ISDN proposal best bet

The McDonald's management team decided Illinois Bell's central office-based ISDN proposal best met the company's technical, support and financial criteria, Krause says.

"It was a perfect fit," recalls Paul Czaplewski, manager of marketing product management with Illinois Bell. "We had recently been designated by AT&T and Bell Communications Research, Inc. to be the first trial provider of ISDN on AT&T's Number 5 Electronic Switching System digital switch. We were looking for a business to be the first trial site when McDonald's called."

The team of managers "decided that we need integrated voice and data over uniform wiring, as well as store-and-forward information distribution and voice messaging," Krause says.

"McDonald's is a communications-intensive company; our people are rarely at their desks. We wanted a way to combat the telephone-tag problem by enabling our employees to access messages when they want to. And management stepped in and demanded a long-term, strategic telecommunications solution," Krause remarks.

"We chose ISDN because it offers us a blueprint for orderly evolution as new technologies become available; it doesn't limit us to one set of products," Krause says.

The company will be able to use 95% of its current wiring with the new ISDN communications system and replace the current analog system "one phone set at a time," Krause adds.

Illinois Bell currently estimates that the price of putting a terminal on the ISDN system will be "competitive with the $1,000 to $1,200 average cost of putting a terminal on a Rolm Corp. or Intecom, Inc. digital private branch exchange," according to Krause.

ISDN services provided by the telephone company will cost approximately twice the current price of Centrex lines, he says. "Those estimates incorporate savings based on shared use of interfaces," Krause notes.

Illinois Bell's ISDN services will be compatible with the old Centrex system, according to Czaplewski. "McDonald's will start with a small number of 2B + D ISDN lines initially and convert more Centrex analog lines to ISDN as needed." 2B + D is the basic ISDN rate defining two 64K bit/sec. "B" channels and one 16K bit/sec. "D" channel, which is used for packetized data and signaling.

The McDonald's trial tests only basic ISDN communications services, defined by layers one through three of the ISO model, Czaplewski notes.

For now, Illinois Bell and McDonald's are concentrating on setting up an ISDN system that can deliver voice, data, text or image transmissions to a user's desktop terminal over the same 64K bit/sec. channel.

Illinois Bell currently has out a request for proposal

SUPER ORACLE™ REPORT WRITER

Create complex reports from your Oracle database with easy one step process. Report format and logic very flexible. Versions for VAX/VMS, IBM PC. Demos available. Contact Stern Consulting, P.O. Box 21171, Cleveland, OH 44121, (216) 397-0551.

Oracle is a trademark of Oracle Corporation

YOU COULD SPEND THOUSANDS ON ONE OF THESE "FAST" DBMS APPLICATION PRODUCTS.

PROGRESS

FASTEST FROM START TO FINISH.

specifying a terminal adaptor that will enable a desktop device to be compatible with McDonald's current equipment base and with ISDN interface specifications.

The first step involves minimizing duplication of resources, administrative overhead and local distribution costs, Krause says. For example, coaxial-attached devices can be multiplexed over a circuit- or packet-switched connection over one or two aggregated 64K bit/sec. B channels. This would eliminate the need for coaxial cable connections.

Eventually, McDonald's plans to use Illinois Bell's digital switch to interface a wide variety of on-premises devices with a range of outside services, such as telephone sets with WATS, public dial-up and T1 lines; personal computers, 3270 terminals and integrated voice/data terminals with remote hosts; and long-distance network services.

The primary trial is scheduled to begin in October at McDonald's Oak Brook, Ill., headquarters. "We'll start with a limited number of ISDN lines, ramping up to 300 to 400 by early 1987," Krause says. A full trial at headquarters should be underway by mid-1987.

If all goes well, the company plans to implement ISDN at its 30 field offices as services become available from other telephone companies.

McDonald's could have installed ISDN switches on its own facilities, but the company chose Illinois Bell's central office-based solution because, "we preferred not to operate and maintain the telephone system on a daily basis, although we did want to manage it," Krause says.

Services not yet offered

Most of the ISDN services that McDonald's will be using during the trial are not yet offered commercially by Illinois Bell. McDonald's also will have to wait for some of the services, such as the option of aggregating 64K bit/sec. channels to provide higher transmission rates.

Currently, Illinois Bell's digital switch only handles 64K bit/sec. channels. "Right now, we would have to do the aggregation on our premises equipment and also provide synchronization," Krause says. This would involve more in-house resources than the corporation currently is willing to expend.

Krause recognizes, however, that "ISDN is not all here today, its issues are not all nailed down." Some issues relate to McDonald's need for a multivendor environment.

"We like to pick and choose our suppliers; the trial involves five or six at least. There has to be an end to finger pointing; vendors have to assume end-to-end responsibility beyond the line where their technical responsibility ends. And we still need multivendor conformance to the standard."

He also points to internal organizational issues that will arise at McDonald's and other companies converting to ISDN. "Most organizations have their voice and data groups separate; those have to be integrated to provide user support.

Multivendor network management products are "still on vendors' drawing boards, and I don't think a global network management interface will happen in the near future," Krause adds. McDonald's will probably implement two or three network control points, each utilizing a different vendor's product, he predicts.

"A lot of work needs to be done in the next year or two," Krause concludes.

McDonald's ISDN goals

McDonald's Corp.'s long-term goals for the Integrated Services Digital Network (ISDN) trial include the following:

- Reduction of costs associated with wiring changes and additions, network access and terminal equipment.
- Increase of productivity by providing employees with store-and-forward messaging and with integrated voice/data systems.
- Service-level improvement, by cutting lead times for new equipment and, through the higher speeds, increased accuracy and decreased downtime associated with an end-to-end digital network.

OR YOU COULD SPEND FIFTY BUCKS TO TEST DRIVE THE ONE WHICH IS TEN TIMES FASTER.

Introducing PROGRESS. An advanced 4GL DBMS that's well worth a closer look.

PROGRESS isn't just a 4GL added on to a DBMS, or the other way around. It's the first product to fully integrate both in one sophisticated system. The first multi-user 4GL DBMS designed from the ground up *expressly* for building, modifying, and customizing transaction-based applications ten times faster than any other product of its kind.

FASTEST FROM START TO FINISH. Created by Data Language Corporation, PROGRESS is unique because it requires far less code, yet still allows complete control, from start to finish.

With PROGRESS, you can quickly prototype an application, demonstrate it to users, then modify it to rapidly complete an application that precisely satisfies their needs.

CRASHPROOF FOR SAFER DEVELOPMENT AND USE. Now you won't have to worry about losing all your data due to power failure or operator errors. PROGRESS automatically rolls back incomplete transactions, for complete data integrity.

PORTABLE ACROSS UNIX, XENIX, ULTRIX AND MS-DOS. PROGRESS applications have the flexibility to run unchanged on multiple operating systems, and on a broad array of hardware configurations.* It has a line-for-line transfer of source, so you can build an application on your PC and port it to your Unix-based machines and vice versa. And we guarantee that it will run.

AUTOMATIC FEATURES OF PROGRESS

- Automatic Database Recovery
- Automatic Error Handling
- Automatic Data Validation
- Automatic Portability Across Unix, Xenix, Ultrix, and MS-DOS
- Automatic Compilation for High Performance
- Automatic Index Selection for High-Speed Relational Joins
- Automatic Record-Locking Control
- Automatic Formatting of Screens/Reports
- Automatic Syntax-Checking Editor

* PROGRESS is available for the • IBM PC, XT, AT, and compatibles • Fortune • DEC VAX (Ultrix) • NCR Tower • Motorola 630C • Pyramid 90XX • and more. Call for a detailed list.

PROGRESS TEST DRIVE

Have to try it to be convinced? For $50, we'll send you the PROGRESS Test Drive. It's a full-function version of PROGRESS limited only by database size, and it includes a working PROGRESS application. And if it's not faster than any other DBMS you've ever tried, we'll refund your money.

The PROGRESS Test Drive comes with an easy to read instructional booklet that will show you how easy it is to get transaction-based applications up and running quickly, virtually eliminating schedule slips, budget overruns and dissatisfied users.

And while you're trying the PROGRESS Test Drive, please feel free to call our technical support staff. You'll find our people are as good as our product.

To receive your copy, call 1-800-FAST4GL. In Mass. call 1-617-663-5000. Or send in the coupon.

PROGRESS.
The DBMS that gives "fast" a whole new meaning.

Send me the PROGRESS Test Drive for $50. If it's not as fast as you say it is, I understand that I am entitled to a full refund anytime within 30 days of receipt.

CALL 1-800-FAST4GL
In MASS., CALL 617-663-5000
Telex: 509965

PROGRESS TEST DRIVE

Name________
Title________
Company________
Address________
City________State________Zip________
Country________Telephone________
Telex:________
Computer________
Operating System________
Enclosed is my: ☐ Check ☐ Visa ☐ MasterCard
☐ Ship COD ($5 extra)
Card Number________Exp.________
MasterCard Interbank Number________
Signature________

DATA LANGUAGE CORPORATION
47 Manning Rd., Billerica, MA 01821
CW5586

PROGRESS is a registered trademark of Data Language Corporation, developers of advanced software technology for business and industry. The following are trademarks of these companies: dBASE of Ashton-Tate, Informix of Relational Database Systems, Inc., Oracle of Oracle Corp., Unify of Unify Corporation, UNIX of AT&T, MS-DOS and XENIX of Microsoft Corp., and ULTRIX of Digital Equipment Corporation.

Dexpo debuts draw users, but DEC policy draws grumbles

Components, software, Microvax II products highlight Dallas show

By Donna Raimondi

DALLAS — While third-party vendors grumbled about Digital Equipment Corp. decisions that cut many of them out of the new VAX products market, thousands of DEC users came to Dexpo South '86 last week looking for components and software.

Close to 7,000 attendees, many of them in town for the Spring Decus U.S. Symposium, pored over the products exhibited at Dexpo, where 200 companies showed more than 500 DEC-compatible products. About the only DEC-related company that was not there was DEC itself, which was running Decus simultaneously.

"DEC's shipment of most available Microvax II products to its very large system integrators is affecting our business in that the big companies that got the Microvax had to buy memory from DEC and not from the open market," said Jack Mueller, manager of memory products at Hamilton Standard Digital Systems, Inc., a memory board vendor. "It's a precondition in the DEC agreement that helps DEC control the market," he added.

Mueller said the difference in price to the customer can be significant — a $13,000 DEC-supplied Microvax II board would cost about $4,000 from a third-party vendor.

Vendors shut out

One Midwestern academic user, looking for add-on memory for his new VAX 8200, was out of luck. "DEC won't let vendors in any more. I will have to buy DEC add-on memory for three times more money and pay a maintenance fee for the rest of my life. DEC is playing hardball now. Field service said if I put foreign memory on, DEC would not maintain the computer," the user said.

But attendees were, for the most part, finding what they were looking for at the exhibition. "I am absolutely pleased with the show," said Ellen Robie, chief of the data systems branch, Department of the Army at Fort Huachuca, Ariz. Robie came looking for relational data base management systems for DEC's VAX machines and left with a shopping bag full of pertinent material.

"I'm at Decus and Dexpo to see what new products there are for the Decsystem-20," said Stan Baer of Harvard University's Business School. DEC relieved his concerns at Decus by announcing that support for the Decsystems would continue until 1994. For the first time, there were no Decsystem-10 or -20 systems exhibited at Decus, "but they do have new products to use on them," he said. "I'm looking for some communications products, too," Baer said. The Harvard Business School is tying 2,000 IBM Personal Computers into the Decsystem-20.

"I'm trying to determine if the software we want to use has been put up on the RSTS/E [PDP-11 operating system]," said attendee Robert Brandt of the Appraisal Group real estate consultants in Dallas. "From the folks I talked to so far, there have been no major improvements in the software for RSTS/E. DEC is pushing VMS so hard that in most applications, it's desirable to move to VAX machines, but for our applications, because of the file structures and other things, RSTS is still more desirable," he said.

New products

Several new products were released at Dexpo. One of the most interesting ones, called a Unibus segment isolator/high-speed repeater, was designed by former DEC engineer Ernest DeFore, now vice-president of Setasi Research and Development in Fort Lauderdale, Fla. The unit, marketed by MRI Computers in Fort Lauderdale, replaces a DEC M920 or M9202 Unibus connector and is said to eliminate the need for additional $13,000 Unibuses as a configuration grows. One of the unit's beta-test site engineers said the $3,000 unit has been running in his installation for a month with no problems.

By far the largest number of products shown involved the DEC Microvax II supermicro. Roger Weidel, an Eastman Kodak Co. Microvax II systems manager, came to the show looking for Microvax II memory boards and for TK50 tape systems for the Microvax, which he said are in "real short supply." Weidel came to Dexpo from Decus, where he said that DEC was showing a model of clustered Microvax IIs.

The only DEC VAXBI-based product released at Dexpo was the ICP1632 intelligent communications processor from San Diego-based Simpact Computer Systems. The vendor said the processor will be generally available in September 1986.

Numerix Corp., based in Newton, Mass., announced that it signed an OEM agreement with DEC whereby Numerix will add its array processors to the Microvax II and VAX 8200 systems in order to create turnkey data acquisition systems for use in laboratory and workstation environments.

1 *Select your ingredients from hundreds of sources. Your mainframe computer. Any database. Other workstations. Even other networks in your office.*

Lasography is the most revolutionary invention to hit the office since xerography.

Lasography makes the difference.

Xerox was responsible for both.

But while xerography faithfully copies your documents, Lasography actually lets you create original documents. And that means more than producing a laser-sharp pie chart.

Lasography means creating graphics that make your point more forcefully. It means writing better letters and more memorable memos.

It means not only manipulating your data in ways you've never dreamed of. It means printing on paper exactly what you've created on the screen.

Your documents won't just look better. They'll *be* better.

Taken separately, these products equal or surpass any on the market. Taken together, they become a whole new way of working. And to keep your Lasographic system working, you can call on the team that invented it. Team Xerox.

Any way you slice it, you're better off with a Xerox pie than an IBM pie. Or even an Apple pie.

2 *Mix text and graphics any way you like on the Xerox 6085 Professional Computer System. Create new charts. Write. Edit. Re-edit. Draw a pie an Apple can never match.*

Strategic investments in automation add up, professors say

Accounting methods quantify potential gains

By David A. Ludlum

BOSTON — Conventional accounting fails to reflect all the benefits of automation and can discourage companies from making valuable investments, two business professors told a national gathering of accountants last week.

Accounting methods should be adapted to realize the gains automation can provide through manufacturing flexibility and product quality, said Grant W. Russell, professor of accounting at Canada's University of Waterloo, and David M. Dilts, professor of operations management at Michigan State University.

The two brought their message to a conference on "Cost Accounting for the '90s" sponsored by the National Association of Accountants. They discussed investments in factory automation, but Dilts told *Computerworld* that their approach also applies to analysis of office automation and information systems. "We need to look at the strategic implications of those investments, too," he said.

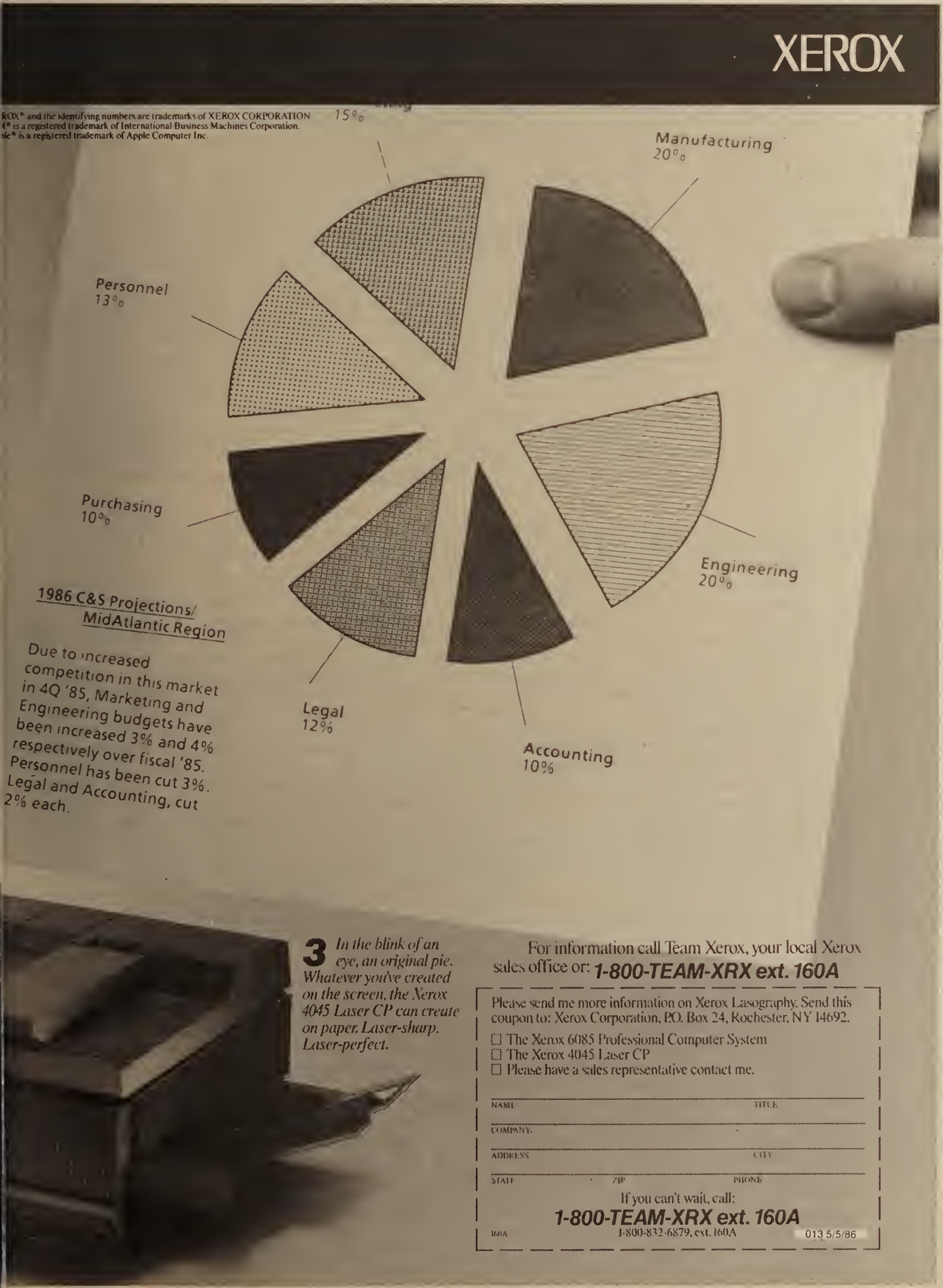
Traditional criteria for judging business investments — the rate of return, payback period and cash flow, for example — work for tactical moves, Dilts said. But in their current forms, which focus chiefly on cutting costs, they might fail to recognize all the benefits of strategic investments, he said. "We have not been equipped to handle major changes in our manufacturing process," Dilts said.

Many of the corporate investments in factory automation to date have been undertaken as experiments because of customers' requirements or from "a basic faith in automation," Dilts said. Such faith does not specify the best approach to automation or point out situations where it is not desirable, he said.

But accounting can be used to quantify the potential gains from investments in automation, the professors said. Taking turns at the podium in tag-team fashion, they outlined several general sources of gain that accountants must learn to account for more effectively. They include the following:

- Manufacturing flexibility, which can speed up changes in product design, production level, the manufacturing process, replacement of products and introduction of new products. "How much is that timing worth to us?" Dilts asked.
- Improvements in product quality through the elimination of random errors that crop up in labor-intensive manufacturing.
- Synergistic benefits to other operations, such as accounting and personnel, through information generated by automation systems.

Dilts said marketing executives have been the most successful in quantifying the impact of manufacturing flexibility and product quality on conventional accounting measures such as return on investment.


15%
Manufacturing
20%
Personnel
13%
Purchasing
10%
Engineering
20%
Legal
12%
Accounting
10%
1986 C&S Projections/
MidAtlantic Region
Due to increased competition in this market in 4Q '85, Marketing and Engineering budgets have been increased 3% and 4% respectively over fiscal '85. Personnel has been cut 3%. Legal and Accounting, cut 2% each.

XEROX

ROX® and the identifying numbers are trademarks of XEROX CORPORATION
I® is a registered trademark of International Business Machines Corporation.
le® is a registered trademark of Apple Computer Inc.

3 *In the blink of an eye, an original pie. Whatever you've created on the screen, the Xerox 4045 Laser CP can create on paper. Laser-sharp. Laser-perfect.*

For information call Team Xerox, your local Xerox sales office or: **1-800-TEAM-XRX ext. 160A**

Please send me more information on Xerox Lasography. Send this coupon to: Xerox Corporation, P.O. Box 24, Rochester, NY 14692.

☐ The Xerox 6085 Professional Computer System
☐ The Xerox 4045 Laser CP
☐ Please have a sales representative contact me.

NAME TITLE
COMPANY
ADDRESS CITY
STATE ZIP PHONE

If you can't wait, call:
1-800-TEAM-XRX ext. 160A
160A 1-800-832-6879, ext. 160A 013 5/5/86

DEC unveils workstation

By Rosemary Hamilton

MAYNARD, Mass. — Digital Equipment Corp. last week added a low-cost, scaled-down monochrome model to its Vaxstation family of engineering workstations and cut the price of two other monochrome workstations.

The company also announced an upgrade package that moves its Microvax II or Vaxstation II systems to the Vaxstation II/GPX, the workstation line it introduced earlier this year.

The Vaxstation II/Restricted Configuration (RC), which is currently available, is based on the Microvax II processor and is offered as two, fixed-package, nonexpandable systems. A 3M-byte version costs $14,995, and a 5M-byte version costs $16,995.

DEC reduced the price of two monochrome Vaxstation II systems by an average of 15%. The $29,600 Vaxstation II now costs $26,000, and the $36,800 version now costs $30,500.

The Vaxstation II/RC was designed for such applications as technical publishing that require minimal memory, whereas other monochrome models in the Vaxstation family are suited for more sophisticated applications such as the development of artificial intelligence tools and systems, a spokesman said.

The Vaxstation II/RC operates under both Ultrix, the vendor's version of Unix, and MicroVMS. The system comes with a 19-in. monochrome monitor, a 71M-byte disk, disk controller, Ethernet interface, 95M-byte streaming tape drive, video subsystem, standard keyboard and mouse.

The upgrade package, scheduled for June release, would allow users of the Microvax II or Vaxstation II to upgrade to the GPX line. Prices will start at $7,050. The company said its VMS operating system for the GPX line will also be released at that time.

VIEWPOINT

EDITORIAL

Hang the user: Vendor vs. pirate

Software piracy is back in the news, with all the drama of a segment of *Miami Vice*. In Hong Kong, police raided a shopping arcade notorious for its sales of pirated goods, netting 17 arrests and $130,000 in stolen software — all thanks to the investigative legwork of Lotus Development Corp. In Toronto an entrepreneur faces 10 counts of criminal behavior for boldly advertising and selling at bargain-basement rates software he copied from a variety of vendors. And, in sunny California, a computer reseller was accused by Ashton-Tate of copying software onto 20M-byte hard disks, which he then sold to users as add-on products.

Because these cases are dramatic, they may be pointed to by vendors and their lobbying groups as an argument for copy protection devices and other unwieldy restrictions on all those who buy and use software products. This would be unfortunate. There is simply no fair comparison between such examples of clear criminal conduct and the legitimate demands of corporate buyers for reasonable agreements on duplicating software within their organizations.

Along some fronts on the anticopying battleground, some software vendors are spending time, energy and legal fees tracking down those few criminals who deserve to be dubbed pirates. But it is far more productive for vendors to spend time, energy and dollars designing better software duplication agreements for that far larger and far more important body of software buyers who inhabit corporate offices.

Notes & observations

A recent thought from Chairman Malcolm (as in the editor in chief of *Forbes* magazine), titled "The Computer Age is Only at Dawn's Early Light":

"There's irony in the fact that early death has come to so many spectacular corporate denizens of America's silicon valleys. There's irony in the fact that malaise still plagues the huskier players plowing our silicon fields.

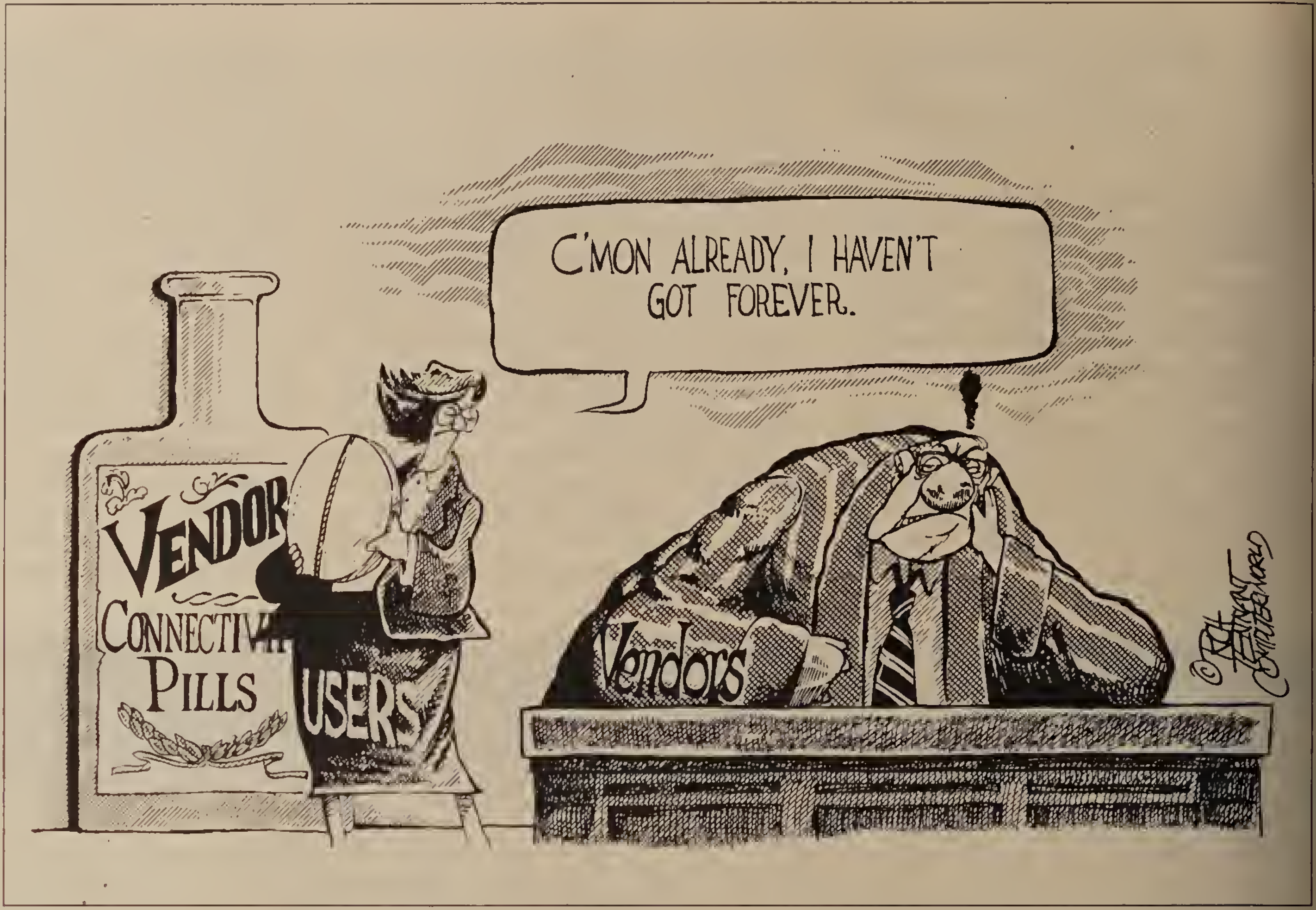
"We've really only opened the door to the Computer Age. Even the wildest or soundest or most soaring imaginations can't predict, foresee, conjure up the dimensions, the ramifications, the impact that lie ahead.

"The transfigurations (pardon the pun) to come from compacting research on computers in health, in mind, in body, in not-yet-born and the analysis and prescribing for the sick are far out — and some still far off.

"From weather to design, travel safety to embracing knowledge of space, for research in every area, computer use is only at the threshold.

"There is no aspect of your daily life and your doings or anyone else's that is not or won't be immensely more affected at a geometrically accelerating pace.

"While this unimaginable Tomorrow won't happen tomorrow, the current bleak pause in the computer field is just that — a pause whose duration will be as varying as the uses, users, makers and visionaries involved."



LETTERS TO THE EDITOR

Misapplying the principle of privacy

Underlying the statement quoted in the editorial, "Computers aren't the issue" [CW, April 14] by Jerry Berman of the American Civil Liberties Union, is the premise that whether or not a government action violates our privacy depends on the power of the technology used. Berman misses the point, as your editorial argues; and the premise, which appears to be a consensus in his milieu, seriously harms the privacy cause and consequently everybody.

I do not recall that the ACLU has challenged the right of government to know who is delinquent in repaying student loans, receives welfare benefits, has taxable income or even is old enough for draft registration. It seems even to concede the right of the government to correlate the information but only in manual, special-case, generally ineffective ways.

To invoke the principle of privacy only when enough technology is applied to inconvenience a substantial number of violators discredits both the principle and, however unjustly, the motives of those who invoke it. If Berman thinks that file matching erodes privacy, then his vocabulary has a gaping hole where "privacy" used to be, to the detriment of what the word used to protect.

To be credible, the privacy advocates need to draw the line where there is a clear qualitative difference between what they do and do not deplore rather than at a point that appears arbitrary, capricious and even frivolous. If the castle walls about our truly private affairs are actually under siege, it is hardly the time to try to expand these walls by declaring private our business affairs and even our financial dealings with the government. This is a matter not only of elementary strategy but of perceived sincerity.

The Internal Revenue Service's objection (to matching information on tax returns with that on welfare rolls and delinquent student loan accounts) also deserves scrutiny. The mandatory notice in the instructions that accompany the federal tax return form explicitly warns that the information you provide can be disclosed to other government agencies.

Is it possible that the IRS is concerned less about violating a privileged relationship (which does not appear to exist really) with the taxpayers and deterring honest reporting of income than about diverting its resources to the aid of other government agencies to the detriment of its own work?

Nothing discredits a noble principle as effectively as misapplying, trivializing and exploiting it for ignoble ends. In this, Berman and the IRS seem to be political bedfellows, but perhaps not so strange.

Daniel J. Lasser
Rockville, Md.

Bug only part of software story

As much as we might enjoy the discomfort of Computer Associates International, Inc. per your article, "Repair of bug in Computer Associates tool hikes CICS bills" [CW, March 17], concerning its CA-JARS/CICS reporting system, we cannot help but be appalled at your unwarranted treatment of this subject. For some reason, you have singled out a rather modest niche product and a rather understandable, if embarrassing, bug.

I can assure you that software development is a humbling experience. No matter how hard you try, no matter how skilled you are, you will fail in some fashion. Inevitably, there is that situation where you can only shake your head and do the best you can. I know that. Other software vendors know that. And I'm sure CICS users know that. Does *Computerworld*?

If one of your 1,000 users complained, would you treat it similarly? Would you even consider the other 999? In this particular case, it seems as if you thought it newsworthy not that the error was fixed, not that the vendor discovered the error, not that the vendor had the courage to fix it, but that the error existed in the past.

Patrick H. McGettigan
President
Landmark Systems Corp.
Springfield, Va.

Computerworld *welcomes letters and publishes those it judges of greatest interest to its readers.*

Preference will be given to typed, double-spaced letters of fewer than 150 words.

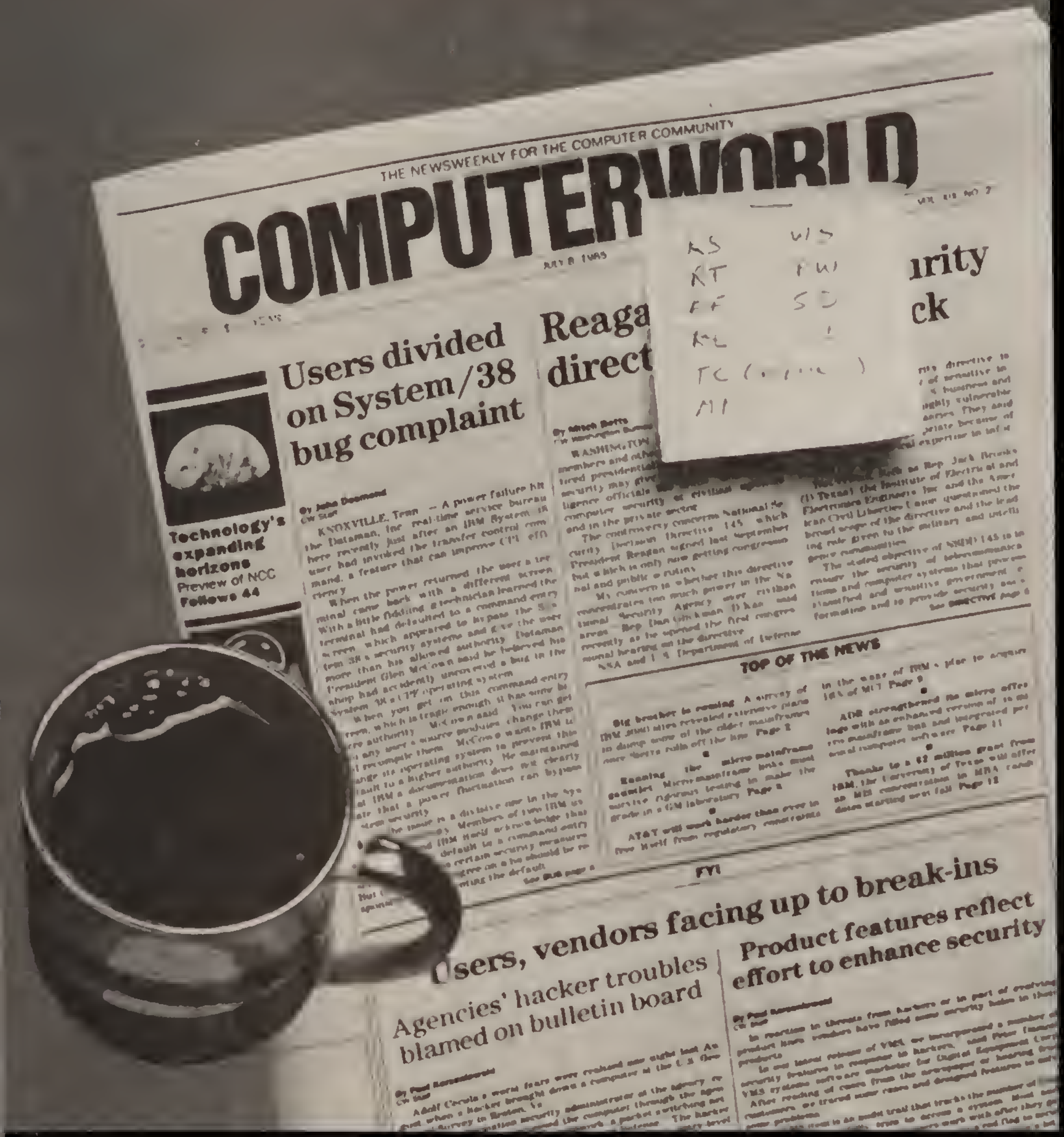
Letters become the property of ***Computerworld*** *and may be edited for the purposes of clarity and brevity.*

Letters should be addressed to the Editor, ***Computerworld****, Box 9171, 375 Cochituate Road, Framingham, Mass. 01701-9171.*

Get off the route slip circuit!

Order your own subscription to COMPUTERWORLD — each issue costs about what you'd pay for a morning's cup of coffee.

Just 86¢ an issue! Plus, a FREE Desk Top Solar Calculator with your paid subscription.


THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
COMPUTERWORLD
Users divided on System/38 bug complaint
Reaga
direct
urity
ck
Technology's expanding horizons
Preview of NCC
Follows 44
TOP OF THE NEWS
FYI
Users, vendors facing up to break-ins
Agencies' hacker troubles blamed on bulletin board
Product features reflect effort to enhance security
KS
RT
FF
KL
TC
MI
WS
PW
SD

Fill out and mail in the attached postage-paid envelope.

YES . . . I'll take COMPUTERWORLD — one full year (51 weekly issues) for just $44. And I'll receive my Desk Top Solar Calculator FREE with my paid subscription. (Allow 6-8 weeks for shipment of your calculator.)

☐ Payment enclosed ☐ Bill me
☐ Charge my credit card ☐ AmEx ☐ VISA ☐ Mastercard

Signature ______________________ Card Expires ________

FIRST NAME M.I. LAST NAME
TITLE
COMPANY
ADDRESS
CITY STATE ZIP

Address shown: ☐ Home ☐ Office

☐ I'm already a subscriber, but I'd like to extend my subscription at this special low rate. (Attach mailing label above.)

Canada, Central & South America $110/ Europe $165/ All other countries $245 (Airmail)
Foreign orders must be prepaid in U.S. dollars.

Please complete the information to the right to qualify for the special introductory rate.

COMPUTERWORLD

Detach here, place in envelope, and seal securely.

Please indicate your business, function, and computer involvement below.

1. BUSINESS/INDUSTRY (Circle one)
   - 10. Manufacturer (other than computer)
   - 20. Finance/Insurance/Real Estate
   - 30. Medicine/Law/Education
   - 40. Wholesale/Retail/Trade
   - 50. Business Service (except DP)
   - 60. Government — State/Federal/Local
   - 65. Public Utility/Communications Systems/Transportation
   - 70. Mining/Construction/Petroleum/Refining/Agriculture
   - 80. Manufacturer of Computers, Computer-Related Systems or Peripherals
   - 85. Computer Service Bureau/Software/Planning/Consulting
   - 90. Computer/Peripheral Dealer/Distributor/Retailer
   - 75. User Other ____________
   - 95. Vendor Other ____________

2. OCCUPATION/FUNCTION (Circle one)
   - 11. President/Owner/Partner/General Manager
   - 12. VP/Assistant VP
   - 13. Treasurer/Controller/Financial Officer
   - 21. Director/Manager/Supervisor DP/MIS Services
   - 22. Director/Manager of Operations/Planning/Admin Serv
   - 23. Systems Manager/Systems Analyst
   - 31. Manager/Supervisor Programming
   - 32. Programmer/Methods Analyst
   - 35. OA/WP Director/Manager/Supervisor
   - 38. Data Comm Network/Systems Mgmt
   - 41. Engineering/Scientific/ R&D/Technical Mgmt
   - 51. Manufacturing Sales Reps/Sales/Marketing Mgmt
   - 60. Consulting Management
   - 70. Medical/Legal/Accounting/Mgmt
   - 80. Educator/Journalist/Librarian/Student
   - 90. Other ____________

3. COMPUTER INVOLVEMENT (Circle all that apply) Types of equipment with which you are personally involved either as a user, vendor or consultant
   - A. Mainframes/Superminis
   - B. Minicomputers/Small Business Computers
   - C. Microcomputers/Desktops
   - D. Communications Systems
   - E. Office Automation Systems

331718618

VIEWPOINT

Departmental computing: PCs and mainframes not enough

By AMY D. WOHL

Frustrated by its lack of success with the System/36 as a "strategic office automation" product, IBM has apparently been suggesting to some of its large customers that the proper approach to office automation isn't a terminal on a System/36, isn't a Personal Computer attached to a 36 or a local-area network but is rather a PC directly communing with an IBM mainframe.

Customers claim that IBM argues that the superior capabilities of its microcomputers make a new architecture possible, one in which the PC takes over many functions that would otherwise need to be based in an intermediate or departmental processor — true.

In addition, IBM claims that Personal Services/Personal Computer on the IBM mainframe offers adequate functionality for system-level functions such as electronic mail and file sharing, that building large office automation systems with departmental processors is too expensive and that this solution fits the overall IBM Systems Network Architecture environment better.

Now, what is going on here? This was supposed to be the year that all those thousands of personal computers in companies of every size started to get interconnected, some by local-area networks, file servers and software and some by departmental processors and office automation software. In fact, some companies are pretty far along this track, with vendors selected, plans in place, pilots under way and early reports of considerable success.

And the notion of the intermediate or departmental processor is an important part of this game *if* the following are true:

- The rush to personal computers was really (at least in part) a strong statement by end users that they wanted to control their own computing destiny.
- Departmental processors, departmentally controlled, are an extension of this perceived need for some end-user control.
- Those of us who struggle to provide a philosophical underpinning for what is going on are correct in identifying the inherent problems of trying to provide all of the systems-level functions, for every level of the organizational hierarchy, all at the mainframe level.

No vice-presidents

To me, an office automation solution that is based only on workstations and mainframes is rather like a company with a president and staff, but no vice-presidents in the middle.

Who will provide coordination and control, corporate memory and experience, management and recommendation? Companies without vice-presidents don't work very well because every time two clerks have a disagreement on how to proceed, the president has to decide what to do. It's an appropriate structure for a very small firm in which the president makes all the decisions anyway. It is a terrible bottleneck for anything larger.

An end-user computing solution that is entirely mainframe- and PC-based assumes that end users can be adequately served by mainframe computers and the support apparatus they offer. I don't think that's likely.

Imagine a normal mainframe environment. It's Friday afternoon. There were two major software upgrades scheduled for this week and a new department full of 3270 Personal Computers to bring up with a new data base application. Everything is behind schedule (as usual), and you're scheduled to be down for 24 hours over the weekend for normal hardware maintenance and some new communication hookups.

The marketing vice-president's secretary calls to say the two of them are working on a report for the chief executive officer, and when she mails the draft back to him (via the mainframe, of course), all the underlines are disappearing. Immediate action is required.

Just finding out what's going on will be difficult. Is it a workstation problem? A communications snafu? A mainframe software (operating system, application, or whatever) problem? And who's going to do the problem determination and resolution in an already overworked environment? Or find a temporary rubber-band-and-band-aid solution?

And who says this is cheaper? Computer resource has to cost something. And baby-sitting big iron can cost substantially more because the job requires more skills than those of a departmental-level analyst or troubleshooter.

Organizational solution

In fact, since most of the cost of end-user computing is really in the support and training — and not in the hardware at all — perhaps we should look at this as an organizational problem and find an organizational (people and management) solution rather than expect the selection of hardware itself to offer profound answers.

The answer is really in the numbers. IBM numbers. System/36 is not doing well in the marketplace — not in the office automation market. Performance, even the improved performance of the newest models, still makes the system expensive and difficult to configure for large-scale installations. And System/36 OA software has never really become competitive with the best solutions of other vendors.

The IBM local-area network-based solutions aren't a real substitute yet

See **PCs** page 18

Wohl is president of Wohl Associates in Bala-Cynwyd, Pa., and editor of "The Wohl Report on End-User Computing" newsletter.

AT&T rides accelerating mobile data communications market

By RON SCHNEIDERMAN

AT&T is about to get into the mobile data communications business.

That may not sound like much at first (in fact, AT&T is not even the first to do it), but as a new and emerging market, the potential is tremendous for end users as well as for vendors.

With direct mobile data, field service people can automatically access a computer like their office coworkers. Mobile data could, during the next few years, launch a whole new category of products and services: special applications software, ruggedized portable computers and terminals, special modems and other communications products like mobile satellite antennas.

Studying the market

AT&T and Basking Ridge, N.J. based Bell Atlantic Mobile Systems have been studying the market for data and private voice transmission services over cellular phone systems for almost a year.

They started by equipping about 50 Washington, D.C.-Baltimore-area cellular customers with special modems for encrypted voice and data transmission. Portable computers were supplied from Hewlett-Packard Co. and Data General Corp. to customers who needed them.

Months later, Bell Atlantic Mobile decided it was pleased with the initial results, but the decision to proceed was left to AT&T, which would have to produce the modems and special central office hardware.

AT&T decided to go ahead, despite the knowledge that, for the time being, the market is limited. Initially, AT&T and Bell Atlantic Mobile see mobile data as a very reliable voice encryption product. Ready markets are federal government agencies, government contractors and others that require secure mobile voice communications. Commercially, there are some niche markets but, so far, very few, which may explain why some very interested parties have delayed product and service announcements.

For example, IBM

IBM is the most prominent example. IBM has been equipping its National Service Division customer engineers with Motorola, Inc. KDT 800 portable data terminals. It now has about 20,000 of these terminals in use in 250 cities and expects to add another 50 or so cities by the end of this year.

IBM estimates it takes about 20 seconds to dispatch a service representative using the Motorola system. The same transaction, using a one-way pager and telephone (the system IBM is replacing), requires an average four to five minutes because the technician must find a phone to acknowledge receipt of a call and get additional information about the service call. In addition, it improves efficiency by eliminating the need to have someone read and relay information off a CRT.

The system works so well that IBM figured it could make a few extra bucks with it by reselling excess capacity. By using simultaneous transmission, up to 1,500 data users can be accommodated on a single KDT 800 channel.

Sell off frequencies

If IBM has, for example, 500 field people on a system, it would be able to sell off the remaining 1,000 frequencies in that market and obtain more than one channel per market.

But IBM has backed off the resale scheme, claiming it has more important things to think about. More likely, IBM discovered just what AT&T did — that board-based applications are hard to find.

Motorola may be wrestling with the same problem. In addition to the KDT 800, Motorola also makes the KDT 480, a mobile data terminal, and a cellular data link for accessing computer systems directly from vehicles. The data link is a 300 bit/sec. modem that plugs the modular connector on the mobile telephone handset into the data link. The portable computer or terminal is then connected to the data link via the RS-232C connector.

User interest

The data link has been available for about a year. Motorola started making it because some of its customers had expressed an interest in mobile data communications.

But very few data links have actually been sold, and some of those that have are being used on an experimental basis.

Motorola's data terminal contract with IBM alone is estimated at $100 million. And there's a lot more where that came from, which (as often happens) has created another problem, albeit an internal one. Obviously, Mo-

See **AT&T** page 18

Schneiderman has been covering the computer and electronics industries as a reporter and editor for more than 20 years.

AT&T rides mobile mart

From page 17

torola would like to rack up more data terminal sales. But which of its related but separate operations will get the business: the telephone marketing organization or the cellular side? Or both? And when? Discussions within Motorola are described by a company executive as "volatile."

Meanwhile, there are also technical problems. Assuming they're left in the car or truck, how well will terminals or computers continue to work in the hot, cold and humidity and in an environment wrought with voltage variations?

Transmission difficulties, resulting in lost data, can be another problem, particularly when customers are handed off from one cell or radio tower to another within the system's area of coverage. But Bell Atlantic Mobile insists this problem has been solved. The system has operated almost flawlessly in field experiments in the data mode, according to the cellular supplier.

Compatibility

Compatibility is another problem. Ameritech Mobile Communications, Inc. in Schaumburg, Ill., markets the Bridge, a modem-like device that allows error-free data transmission over a cellular network, and Span, which enables Bridge to retransmit data if it is lost in transmission. Both were developed by Spectrum Cellular Corp. of Dallas.

Despite interest in its mobile data service, Ameritech Mobile Communications discovered that before it can lock up a commercial account, it must be compatible with a customer's data base, and that can take months.

Who will use mobile data communications? Most large companies now have some form of portable data applications in field test. Rather than simply uploading and downloading information, sales reps could do interactive tasks and begin to develop applications. The AT&T/Bell Atlantic Mobile team sees immediate possibilities from manufacturers' reps and in real estate (as Ameritech has found), where financial programs and data bases are important.

It may take a little time for mobile data communications to develop, but it should be an important addition to existing data services.

PCs, mainframes are not enough

From page 17

(although they may be some day). The PC Network doesn't have enough software to be competitive with the supermicro- and supermini-based solutions from vendors like Digital Equipment Corp., Data General Corp., Hewlett-Packard Co. and Wang Laboratories, Inc.

And the Token-Ring won't attach anything but Personal Computers until early 1987, so it can't get at even the limited functionality of the PS/370 mainframe and PS/36 minicomputer solutions.

Waiting not good enough

Apparently (if we read the customer tea leaves correctly), IBM has decided that keeping customers waiting won't be quite good enough, so it has trotted out the PC-to-mainframe solution, which has the advantage of being available right now.

Whenever a trend moves too far out to the right we correct it by going too far to the left. So if PCs on their own have gotten out of control, the solution will be to overcentralize rather than to apply a more sensible mid-course correction and centralize a little bit, through centrally agreed-upon guidelines and intermediate-level, largely departmentally controlled, processors.

> ”
>
> ***Apparently, IBM has decided that keeping customers waiting won't be quite good enough, so it has trotted out the PC-to-mainframe solution, which has the advantage of being available now.***

Guess what? That won't work.

Users won't give up the control they've so carefully grown and grown up to deserve. DP departments can't find mainframe software (IBM's or anyone else's) that is competitive with the systems-level features provided by good, departmentally based solutions, and users won't (and shouldn't) settle for less.

Not prepared to provide support

And even if data processing departments could find software, they are not prepared to provide and manage the numbers of support people who would be required to make it all run smoothly.

Besides, who should set marketing department computing priorities — the marketing department or a newly appointed guru in the data processing department who has never worked in the marketing department at all and isn't under its control or direction?

Note that this is not a diatribe against mainframes. We need them. They are just not now (and they may never be) adequate for more distributed solutions to the office computing problem.

WANG ANNOUNCES A MINI-MIRACLE.
THE VS 5 AND VS 6.
THREE TIMES FASTER FOR 20% LESS.

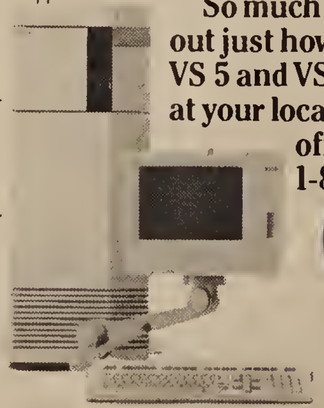
Incredibly faster response times, incredibly low prices. That's what Wang's two new VS systems offer you. And thanks to Wang's unique architecture, this means more powerful processing with less memory use, whether you use a VS as a departmental processor, a node in a distributed processing network, or as a small business computing system.

And because these new systems are all part of the Wang VS family, they all support the same languages, applications and protocols, and offer an easy upgrade path.

COMPARE OUR TWO WITH THE MICROVAX II.*

APPLICATIONS	VS 5 VS. MICROVAX II (8 USERS)	VS 6 VS. MICROVAX II (16 USERS)
TRANSACTION PROCESSING:	• Up to 25% faster response time • 27% lower cost	• Up to 50% faster response time • 22% lower cost
TEXT PROCESSING:	• Up to 2 times faster response time • 30% lower cost	• Up to 3 times faster response time • 27% lower cost
INTEGRATED OFFICE APPLICATIONS:	• Up to 50% faster response time • 30% lower cost	• Up to 2 times faster response time • 27% lower cost

*Costs based on total cost of ownership (list price and maintenance over 5 years).
QCWa
© 1986 Wang Laboratories, Inc.



So much for so little. Find out just how miraculous the VS 5 and VS 6 really are at your local Wang sales office, or call 1-800-225-9264.

WANG

MICROCOMPUTERS

SMALL TALK
Eric Bender

HAL: Not just another add-on

Under the original billing, Lotus Development Corp. was to showcase a new package, but nothing was ready for prime time. So last month's Boston Computer Society meeting saw a work-in-progress view of HAL, the Human Access Language add-on for 1-2-3.

Just as it did in a private demo last October, when we all joined the chorus telling Bill Gross to go talk to Lotus, HAL looked impressive. Gross — who comes across in person like Bill Gates on speed — and his brother Larry worked late into the Pasadena night on pizza and adrenaline and really created something useful.

While HAL offers an English-language interface for 1-2-3, that's not the main point. HAL's real benefit is that it tries to figure out what jobs you need to accomplish (like setting up ranges) and carries them out, as Gross said. He predicted that the greatest single payoff will be easier setup requirements.

Among HAL's services, some are new and some not. HAL automatically creates transcripts of work sessions. It offers an UNDO command for file retrieval, work-sheet Erase and other potentially catastrophic moves. HAL can highlight dependencies within a work sheet. It offers powerful Find and Replace features. There's a translation key that translates user requests into 1-2-3 commands and displays those.

Another jazzy (not Jazzy) feature is self-documenting English-language macros. "You're literally writing mac-

See **HAL** page 25

Bender is Computerworld*'s senior editor, microcomputers.*

Dbase tracks crime on-line

Florida investigators keep files on suspects, associates

By Douglas Barney

If you are a narcotics trafficker in Florida, the biggest threat to your livelihood may be the long arm of Ashton-Tates's Dbase III Plus.

The Florida Department of Law Enforcement uses Dbase in criminal investigations to sort, analyze and track information on criminals and suspects. Now the department is working on upgrades of its applications using Dbase III Plus, which also is gathering positive reviews from other users with less dramatic jobs.

Running applications written in the Dbase programming language by special agent Robert Pennington, the department gets information on suspects in seconds instead of days.

"If I have a file of associates of some criminal elements or criminals, I can run comparisons and have the associates and everybody who has similar associates dumped out into a third file," Pennington says. "Then I can find out immediately if two criminals, or two bad guys, might know each other because they are talking to the same associates."

Pennington has written other applications in the same vein, such as a wire-intercept system.

"Every call has data elements associated with it: the number that was dialed, the time, the date, the time when he went on hook, off hook, that kind of thing," Pennington notes. "All that information used to be put on 3-by-5 cards and filed away in shoe boxes. If a supervisor walked in or an analyst asked, 'Did this number get called?' it was not uncommon to spend days sprawled out on a floor with shoe boxes full of 3-by-5 cards. We can now have that information literally in two to three seconds."

And because current wire-intercept devices are based on microprocessors, information from wire taps can be automatically dumped into Dbase files. "We have a separate data base file, which maintains a list of targets, or suspects, and their phone numbers. We can then compare those two

See **DBASE** page 26

Ashton-Tate sets DBMS pace

By Douglas Barney

Microcomputer data base management software is so dominated by Ashton-Tate's Dbase, which holds some 60% of the market, that Lotus Development Corp. will wait for a crop of machines with a newly upgraded operating system before entering the market. Neither has Microsoft Corp., the second largest independent microcomputer software vendor, tried its luck.

But many firms, some of them veterans, have not been scared away and are still vying for the slice of the pie Ashton-Tate has yet to consume. These firms argue that user dissatisfaction over Dbase's complexity, coupled with a growing market, leaves plenty of opportunity.

Some also argue that Dbase has the largest installed base only because it was one of the first commercial offerings. "They were out first with a high-end data base that did a lot if you knew how to program," says Steven Dow, president of Ansa Software Co., which markets Paradox data base software.

But pessimists point out that the data base market is marked by turmoil, with rampant price cutting, acquisitions and the recent entry of low-priced clones of Dbase.

One example of the fierce competition came last month from Microrim, Inc., the second biggest player with an estimated 10% to 15% share of the market. Microrim announced a promotion that runs until June 30 under which customers receive a free copy its R:Base 5000 package with every order. (According to industry scuttlebutt, a new version of R:Base will appear in the near future.)

See **ASHTON-TATE** page 24

INSIDE

Many laser printers debut at Comdex/Spring/**22**

AT&T releases Simul-Task, Unix/MS-DOS system software for the AT&T PC 6300 Plus/**24**

NEW THIS WEEK

- Insight Development offers emulation software for HP's Laserjet
- Summagraphics upgrades Mactablet and offers Summamouse
- For more on these and other new products, see pp. 81-104.

INSTANT ANALYSIS

"You're literally writing macros that are just straight documentation of what you're doing."

— Bill Gross, Lotus Development Corp., on the Human Access Language for 1-2-3

Oracle's SQL★Calc makes a relational DBMS as easy as 1-2-3.

Oracle Corporation has developed a Lotus 1-2-3 compatible spreadsheet and integrated it with its ORACLE® relational database management system (DBMS). The new product, SQL★Calc,® is the first to combine a mainframe-class relational DBMS with an easy-to-learn and familiar PC spreadsheet user interface.

SQL★Calc is designed for 1-2-3 users who've run out of memory, flexibility and patience. SQL★Calc allows you to put SQL database commands into spreadsheet cells . . . just like formulas. This permits you to access large amounts of data directly from your spreadsheet.

Like all Oracle Corporation products, SQL★Calc runs identically on mainframes, minicomputers and PCs.

SQL★Calc's foundation is the ORACLE relational DBMS, which provides users with a complete set of SQL commands through which they can create, retrieve, modify and otherwise control their data. SQL is the industry standard database command language for large computers. The SQL commands available in ORACLE are identical to the SQL commands in IBM's premier mainframe relational DBMS products, SQL/DS and DB2.

Built on this powerful DBMS foundation is a Lotus 1-2-3 compatible spreadsheet that allows users to put SQL commands into spreadsheet cells in the same way as they enter formulas. When a SQL command for data retrieval is entered into a spreadsheet cell, information is automatically retrieved from the database and placed into the spreadsheet. SQL★Calc also permits users to modify the database – and even create new database tables – directly from the spreadsheet.

Spreadsheet
A B C D
1 2 3
1·2·3 COMPATIBLE

Relational DBMS
IBM·SQL COMPATIBLE

SQL•Calc
ORACLE
$995

SQL★Calc is easy to learn because its menu and command structure are compatible with those of Lotus 1-2-3. And SQL★Calc's ORACLE DBMS requires no supplement: It is vastly more powerful than the database components of 1-2-3, Symphony, Framework, dBase II, dBase III, or any other PC DBMS.

SQL★Calc is available immediately for IBM PC/XTs and ATs for $995.* SQL★Calc will soon be available on a wide variety of systems, including IBM mainframes, DEC, DG, and other superminis, and most UNIX systems.

For further information, or to order your copy of SQL★Calc, call 1-800-345-DBMS. Or write Oracle Corporation, Dept. CS, 20 Davis Drive, Belmont, CA 94002.

ORACLE®
Compatibility • Portability • Connectability

* Please inquire about our "Corporate 50" program for quantity licensing.
Copyright © 1986 by Oracle Corporation. ORACLE,® SQL★Calc® Oracle. IBM, AT&T, Lotus and Ashton-Tate own numerous reg. trademarks. TRBA

THE SAS®

Fourth Generation Software

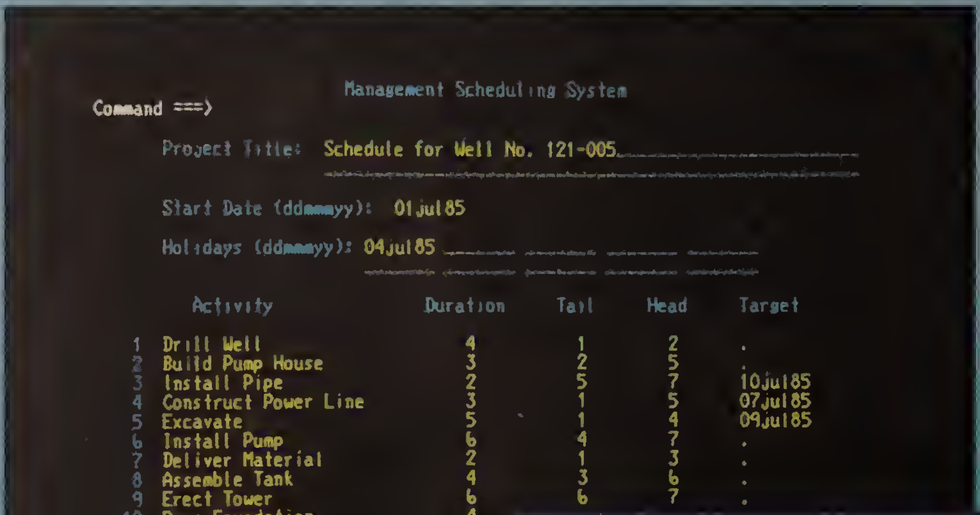
Now there's one software solution for all your Information Center needs. One solution for all your applications, for all your mainframes, minicomputers, and microcomputers. One solution—the SAS® System.

One Solution to Integrate All Your Computing Tasks.

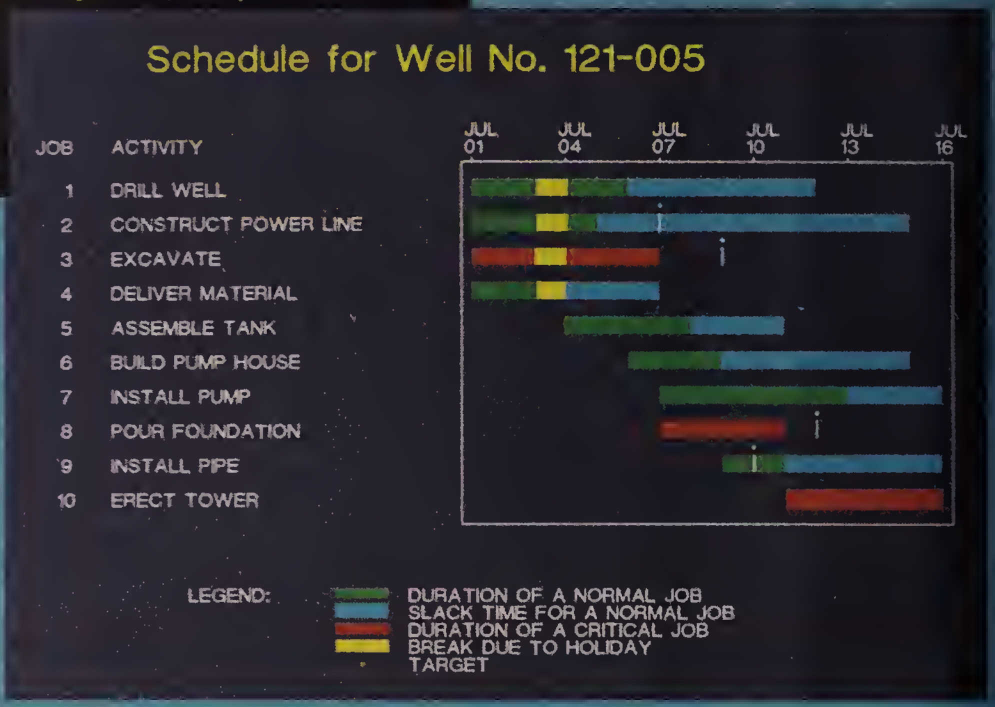
The SAS System gives you efficient data management, superior statistical tools, an easy report generator, customized presentation graphics, and more. Choose between the simple English-like command language or a front-end menuing system with fill-in-the-blank screens. On-line help facilities make it easy to handle every application, quickly and accurately.

You can track sales leads, manage prospect files, determine market share, and present results with the SAS System. Plus you can file employee and applicant records, analyze benefit programs, and manage the payroll. The SAS System can handle all your accounting applications, and produce spreadsheet reports automatically.

That's not all. With the SAS System, you can take orders, keep inventory, and produce mass mailings. Schedule projects, determine product mix, and make forecasts. Your DP staff can measure hard-



```
                          Management Scheduling System
Command ===>

     Project Title:  Schedule for Well No. 121-005

     Start Date (ddmmmyy):  01jul85

     Holidays (ddmmmyy): 04jul85

        Activity                  Duration    Tail    Head    Target

   1  Drill Well                       4        1       2       .
   2  Build Pump House                 3        2       5       .
   3  Install Pipe                     2        5       7     10jul85
   4  Construct Power Line             3        1       5     07jul85
   5  Excavate                         5        1       4     09jul85
   6  Install Pump                     6        4       7       .
   7  Deliver Material                 2        1       3       .
   8  Assemble Tank                    4        3       6       .
   9  Erect Tower                      6        6       7       .
  10  Pour Foundation                  4
  11
  12
  13
  14
  15
```



SYSTEM

for Your Information Center.

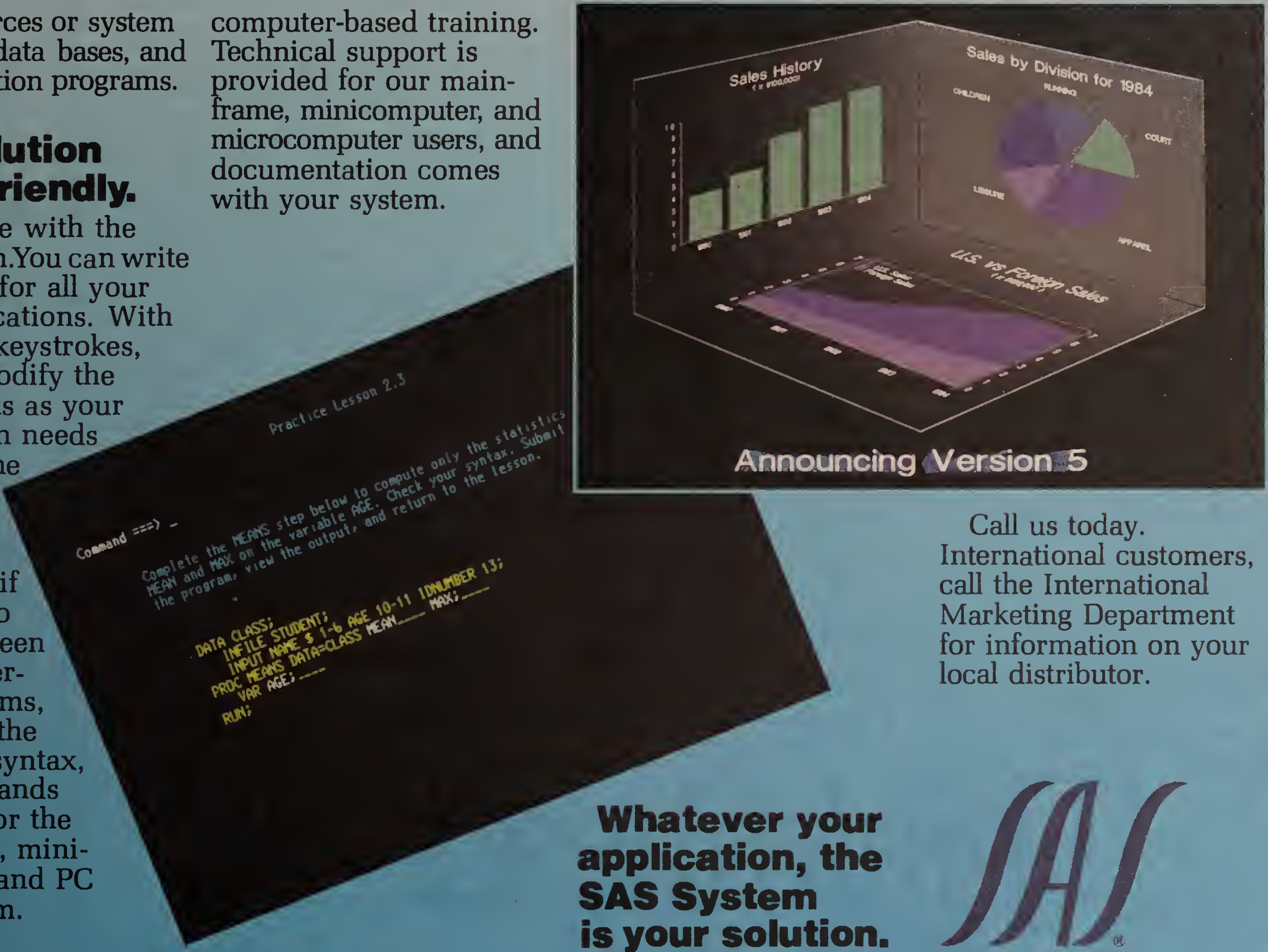
ware resources or system usage, test data bases, and run production programs.

One Solution that's Friendly.

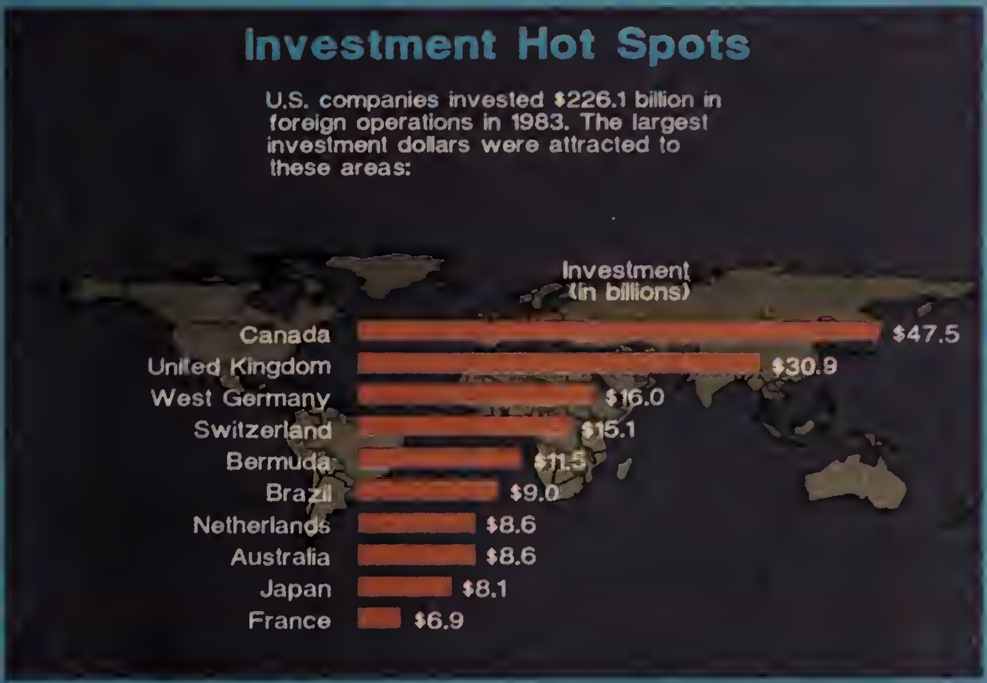
It's simple with the SAS System. You can write front-ends for all your SAS applications. With just a few keystrokes, you can modify the applications as your information needs change. One language handles all your tasks. And if you need to move between several operating systems, you'll find the language, syntax, and commands the same for the mainframe, minicomputer, and PC SAS System.

One Solution with Full Support.

Training is easy too. We offer instructor-based, video-based, and computer-based training. Technical support is provided for our mainframe, minicomputer, and microcomputer users, and documentation comes with your system.



```
Practice Lesson 2.3

Command ===> _

Complete the MEANS step below to compute only the statistics
MEAN and MAX on the variable AGE. Check your syntax. Submit
the program, view the output, and return to the lesson.

DATA CLASS;
  INFILE STUDENT;
  INPUT NAME $ 1-6 AGE 10-11 IDNUMBER 13;
PROC MEANS DATA=CLASS MEAN___ MAX;___
  VAR AGE;___
RUN;
```



Call us today. International customers, call the International Marketing Department for information on your local distributor.

Whatever your application, the SAS System is your solution.

SAS®

SAS Institute Inc.
SAS Circle, Box 8000
Cary, North Carolina
27511-8000, USA.

(919) 467-8000, x280
Telex 802505

The SAS System runs on IBM 370/30xx/43xx and compatible machines under OS, TSO, CMS, DOS/VSE, SSX, and ICCF; on Digital Equipment Corp. VAX™ 8600 and 11/7xx series under VMS™; on Prime Computer, Inc. Prime 50 series under PRIMOS®; on Data General Corp. ECLIPSE® MV series under AOS/VS; on IBM XT/370 and AT/370 under VM/PC; and on IBM PC XT and PC AT under PC DOS. Not all products are available on all operating systems.

SAS is the registered trademark of SAS Institute Inc., Cary, NC, USA. VAX and VMS are trademarks of Digital Equipment Corp., Maynard, MA. PRIMOS is the registered trademark of Prime Computer, Inc., Natick, MA. ECLIPSE is the registered trademark of Data General Corp., Westboro, MA.

Copyright © 1985 by SAS Institute Inc. Printed in the USA.

Printer technology advances; price hikes get ink at Comdex

Strong yen forcing some prices up

By David Bright

ATLANTA — Last week's Comdex/Spring '86 saw the debut of a number of laser and other desktop printers that were said to mark advances in price/performance and functionality.

However, there was one negative note for customers: Several vendors of Japanese-made printers were preparing to increase prices because of the strong value of the yen. Some major suppliers, including Epson America, Inc. and Citizen America Corp., have already raised their prices. Epson's prices have risen 5% to 15% on selected models.

With its $1,895 Laserpro Express, Office Automation Systems, Inc. dropped price points slightly for laser printers. The Laserpro Express emulates Hewlett-Packard Co.'s Laserjet, Diablo Systems, Inc.'s 630, Qume Corp.'s Sprint 11 and Epson's FX-80 printers and reportedly has a duty cycle of 10,000 pages per month.

Available in July, the Laserpro Express provides 300 by 300 dot/in. resolution, 10 bit-mapped fonts and 384K bytes of memory. Office Automation Systems should continue to lower the prices of laser printers, marketing support manager Al Rocheleau predicted.

The Laserpro Express undercuts by $100 the price of QMS, Inc.'s 6 page/min Kiss laser printer introduced last fall. Art Hyzer, QMS executive vice-president, suggested that $1,500 is the next logical step in the price-cutting process.

QMS introduced the Big Kiss laser printer, a $2,995, 8 page/min unit that offers 17 resident fonts and ANSI X3.64 support as well as Diablo, Qume and Epson emulations, 640K bytes of random-access memory (RAM) and maximum graphics resolution of 300 by 300 dot/in. QMS rates the duty cycle at 5,000 pages per month.

Digital Equipment Corp. introduced the LN03 Plus, which offers 1M byte of full bit-map memory and Tektronix, Inc. 4010/4014 compatibility. The printer costs $4,995 and will begin delivery in June. DEC's original LN03 printer, now priced at $3,495, can be upgraded to the new model with a $1,595 kit.

AST Research, Inc. introduced its first laser printer, a $4,995, 8 page/min model intended for high-volume, multiuser environments. The Turbolaser can print 5,000 to 10,000 pages monthly, with a life expectancy of 600,000 pages, according to AST.

Available in July, the 300 by 300 dot/in. printer can emulate standard text printers and graphics plotters using HP's Graphics Language, and it supports HP's Lasergraphics Language desktop publishing package. A variety of bit-mapped fonts, including fixed-pitch and proportionally spaced text, are resident.

Ink-jet printer unveiled

While the laser printer competition intensified, start-up Howtek, Inc. took another tack with the Pixelmaster color ink-jet printer. "We expect our technology to do for office printing and desktop publishing what Technicolor did for movies and Kodachrome did for film," stated Howtek Chairman Robert Howard, who also founded Centronics Data Computer Corp.

Priced at $2,995, the Pixelmaster uses a crayon-like solid plastic ink to eliminate clogging and to provide sharper, raised, near-offset-quality print, according to Howard. The ink is heated and liquified, then shot through the rotary print head onto standard paper.

The unit offers 240 by 240 dot/in. resolution at 2 page/min for text and 4 page/min for graphics. Production shipments will not begin until sometime in the fall, and distribution will initially be through OEMs.

Hoping to continue the popularity of its 24-wire dot matrix printers, NEC Information Systems, Inc. introduced the Pinwriter CP6 and CP7 color models, with respective prices of $849 and $1,049. With their 360 by 360 dot/in. resolution, the seven-color printers eliminate the need for pen plotters, said Bruce Thatcher, director of peripherals marketing. The 80-col. CP6 and the 136-col. CP7 produce 216 char./sec. in high-speed mode, 180 char./sec. in draft and 65 char./sec. in letter quality.

At 100 char./sec., Star Micronics, Inc.'s new NB-15 dot matrix printer offers one of the highest letter-quality speeds on the market. The 24-wire NB-15 retails for $1,449 and prints at 300 char./sec. in draft-quality mode.

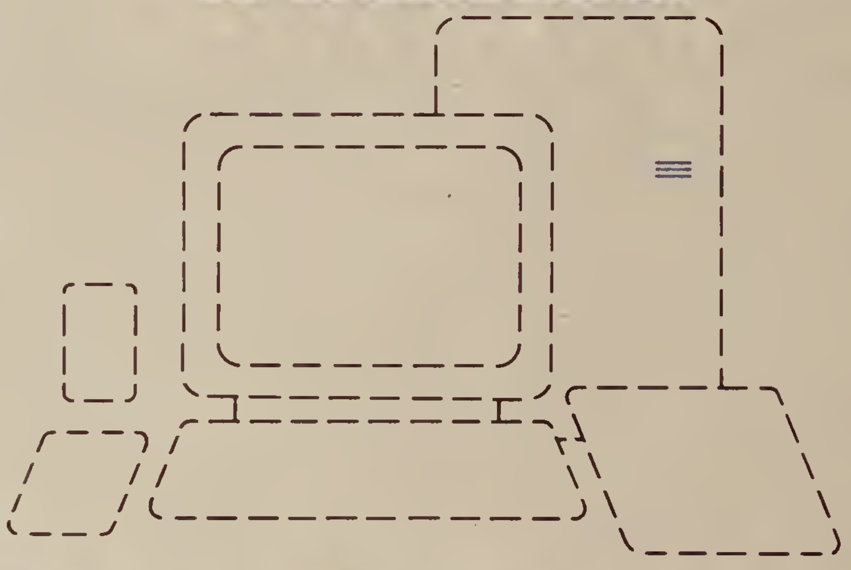
Star also announced the $379 NL-10 dot matrix printer, a nine-wire, 120 char./sec. model featuring plug-in interface cartridges that make it compatible with the IBM Personal Computer and most PCs.

Since Star's printers are made in Japan, the rising value of the yen may force Star to raise prices on existing models, said Tom Bongiorno, director of marketing.

And at Okidata Corp., moderate price increases are inevitable, according to marketing director Jim Cullen. "The pressure is on," he said.

Senior writer Peggy Watt contributed to this report.

Think.



Think ahead.

At Spectragraphics, we've always had a company philosophy of not just thinking, but thinking ahead. It's something to strive for. And it does more than just sound nice in our corporate brochure.

It pays off.

For example, last year we introduced the DesignSet 1080,™ a graphics terminal that's compatible with the IBM 5080.

As good as it was at the time, the most important feature of the DS 1080 was its potential. A designed-in potential for growth with easy field upgrades. So every DS 1080, this year's or last's, can have all the most up-to-date features we have to offer. With complete compatibility and maintainability. Which gives our model a future without planned obsolescence.

Unfortunately, that wasn't an option given to customers of companies who merely think. Customers who are now working with out-of-date models that aren't even a year old.

In addition to the foresight we have in designing products, Spectragraphics has the track record, stability and service to back them up. Because we know that those things help just as much in making your system run smoothly.

So, all that being said, the decision is up to you.

You can think.

Or you can think ahead. With Spectragraphics.

SPECTRAGRAPHICS
Where your ideas take shape.
Spectragraphics Corp., 10260 Sorrento Valley Rd,
San Diego, CA (619) 450-0611.
DesignSet 1080 is a trademark of Spectragraphics Corporation.

Televideo uncages Personal Computer AT compatible

Desktop unit said to be faster, smaller than AT

By Peggy Watt

ATLANTA — Televideo Systems, Inc. last week celebrated the "Year of the Tiger" by introducing the Telecat-286, a $2,995 IBM Personal Computer AT-compatible microcomputer.

The new desktop system, which was unveiled with a real (and heavily sedated) tiger at a Comdex/Spring '86 press conference, is said to be both faster and smaller than both the IBM PC AT and an earlier Televideo AT clone, the Tele-286.

Available now, the Telecat-286 runs at 8 MHz, but can switch to the AT-standard 6 MHz for software requiring the slower speed. The system comes with a standard 512K bytes of random-access memory and sockets for a full megabyte of on-board memory; one 1.2M-byte floppy disk drive; five expansion slots; and one serial port and parallel port.

A 30M-byte hard disk drive is optional, and the system comes with Microsoft Corp.'s MS-DOS 3.1. Televideo said the Telecat-286 measures 16 in. by 16½ in., providing a footprint 28% smaller than the IBM PC AT.

Televideo envisions the Telecat-286 as a powerful single-user system for users of Intel Corp. 80286-based systems who want a stand-alone PC. The firm's older Tele-286 is positioned as an alternative AT-compatible file server, not as competition for the new micro, said K. Philip Hwang, Televideo Systems founder and chairman. Hwang said Televideo will step up dealer support, offer training programs and promote a troubleshooting service.

According to Hwang, the Sunnyvale, Calif.-based company, which last year posted its first loss in 10 years, is already recovering from "too rapid growth."

Last year, the company dropped from 1,270 to 650 employees but has now rebuilt to about 700 employees, Hwang said. Televideo wrote off more than $80 million in inventory, which Hwang said remains steady at $20 million now.

Other Televideo announcements at Comdex included the Networkstation, a $995 diskless workstation intended for use with Televideo's Personal Mini multiuser PC networks.

It also introduced the PT100 terminal, a $499 system with Digital Equipment Corp. VT100 and VT52 compatibility, and PM/Link, an option to the PM/Netware 2 system software for Televideo's Personal Mini network product line that allows larger configurations up to eight groups of 16 workstations.

Televideo also showed two new earlier-announced graphics terminals, the 995 and 9220 Graphics for Tektronix, Inc. Plot 10 programs, both priced at $1,129.

Dest enhances optical scanner

MILPITAS, Calif. — Optical reader manufacturer Dest Corp. has enhanced its Text Pac software, which runs Dest's PC Scan hardware, to read dot matrix output and transfer written material into a greater variety of word processing programs.

Text Pac Version 2 can put scanned text into formats compatible with Microsoft Corp.'s Word, Satellite Software International's Wordperfect and Multimate Corp.'s Advantage word processing programs. The original version supported the IBM Displaywrite 3, Multimate's word processing programs and Micropro International Corp.'s Wordstar and Wordstar 2000 formats.

The new release also permits PC Scan to read, in a single pass, dot matrix output from the IBM Proprinter, Okidata Corp. Microline 92 and 192, Epson America, Inc. FX-85, 185 and LQ1500, Hewlett-Packard Co. Think Jet and Star Micronics, Inc. SQ10 printers. The system can read output printed in 10 pitch, 12 pitch and proportionally spaced type fonts.

Text Pac Version 2 is $595, the same price of the original version. Owners of Version 1 can upgrade through their dealers for $95.

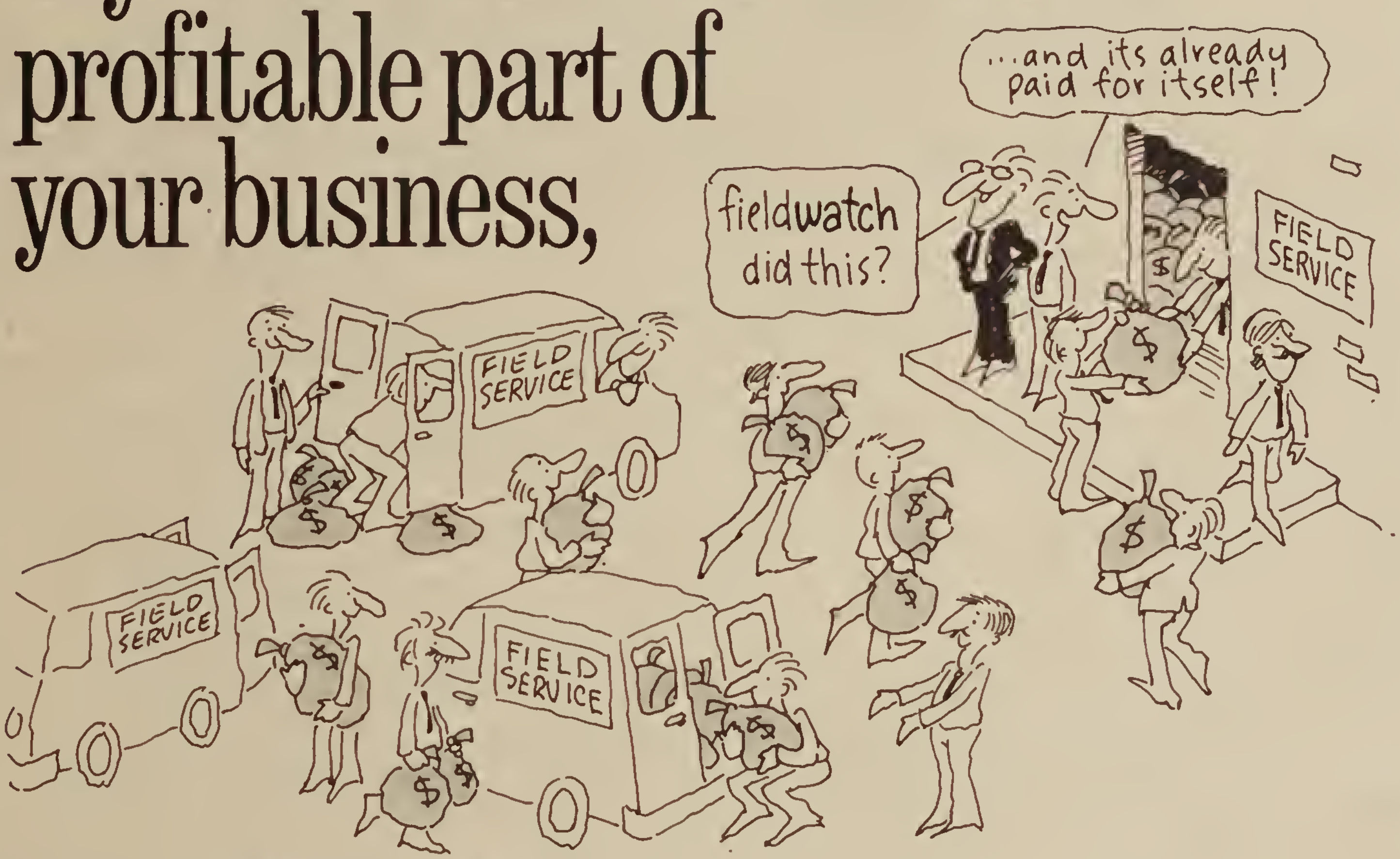
"We have a continuing effort to add word processing programs," said Pat Groves, Dest marketing director. Dest also is refining graphics scanning and hopes to release additional enhancements in that area, he said.

Groves said corporate customers, who are keeping more records on-line but are slow to convert older materials that are still put into filing cabinets, are just becoming aware of the potential of scanners.

Dest's orders have been steady, and the company's officers are pleased with the projected fiscal year results, due out in May, Groves said. Last year's earnings were $2.6 million on revenue of $18.6 million.

In March, the company introduced four low-end scanners for dedicated word processing systems in addition to its Workless station document reader. Those machines also picked up some of the slack in OEM sales, which were once a mainstay of Workless marketing but slowed last summer, Groves said.

If you want Field Service to be a profitable part of your business,



run it like a business.

It's amazing how much money some companies are making these days from field service.

Or is it?

All it takes is the same things you need to make money anywhere: Good organization. Good people. And good tools. Like *fieldwatch*™ field service management software.

fieldwatch is a comprehensive, modular system that can manage dispatching, logistics, billing, scheduling, and management reporting.

The result: a leaner organization that delivers better service, better customer satisfaction, better cash flow and better profits – all at once.

No wonder so many companies are making money on field service these days. To find out how *fieldwatch* can help your organization, send for our free *Return on Investment Analysis* diskette. We'll also send you full details on our new lease/installment payment plan that makes our fast payback even better.

fieldwatch™

See for yourself how *fieldwatch* can pay for itself in your company *in less than a year.* Our PC compatible "Return on Investment Analysis" diskette is full of facts and figures on cost justification. And you can either use our numbers or insert *your own* instead. Simply send us the coupon or call our toll-free number and ask for Kimberly Lilly.

1-800-247-1300. In Mass., call 617-272-4100.

Name ______________ Title ______________

Company ______________ Phone ______________

Address ______________________________

City ______________ State ______________ Zip ______________

THE DATA GROUP CORPORATION
A NYNEX Company

The Data Group Corporation
Burlington Business Center Two
77 South Bedford Street
Burlington, MA 01803

C 5

Ashton-Tate sets DBMS pace

From page 19

Mail order firm Diamond Software Supply is currently offering R:Base 5000, which lists for $700, for only $349, with the free copy.

Other price cuts abound. Analytica Corp.'s Reflex sold for $495, but after being acquired by Borland International, Inc., its price was slashed to $99 and then raised to $149.95. Enrich from Migent Software, Inc. dropped to $395 from $595, and the price of Powerbase from Powerbase Systems, Inc. was cut from $595 to $349.

Bob Leff, cochairman of Software distributor Softsel Computer Products, Inc., calls this arena a no-man's-land. "They couldn't make it at $495 to $595." Leff, however, says he believes that the lower prices may help to boost sales.

Despite its pressures, microcomputer data base software is still one of the fastest growing software markets, vendors say. And it contains many niches.

Some firms attempt to face Ashton-Tate head-on by providing products with lower prices and more features or ease of use. Ansa's Dow, like many others, says there is room for his firm's package because users are dissatisfied with Dbase.

But others plan to coexist with Ashton-Tate. Wordtech Systems, Inc. of Orinda, Calif., gives the most recent example of this strategy with DBXL, introduced at Comdex/Spring '86. This $169 Dbase III Plus workalike uses Dbase III Plus data and index files, provides networking capability and supports Dbase III Plus syntax as well as its report and format files. It targets users interested in a powerful, Dbase-style package at a sharply reduced price.

Similarly, Alpha Software Corp. of Burlington, Mass., is set to introduce Data Base Manager III, a package that directly reads Dbase III disks but offers more menu-driven capabilities. Alpha's package, according to analysts, will sell mainly to users in large corporations that desire an easier-to-use data base that easily shares Dbase III data.

Jeffrey Tarter, publisher of the "Soft-Letter" industry newsletter, says that the only firms that will survive will be those with Dbase file-compatible products. "The question is whether they can really take a Dbase disk and read it," Tarter says.

Others, such as Migent's Enrich, the $600 Dataease from Software Solutions, Inc. and the recently introduced Simple, a $995 package from Los Angeles-based Software Merchants Unlimited, push ease of use and ease of generating applications.

All data base vendors, it seems, expect high growth in sales. Arun K. Gupta, president of Software Solutions, expects his firm's market to increase by a factor of five. The firm has already sold more than 70,000 copies, according to Gupta.

Kent Johnson, president and chief executive officer of Microrim, says the data base market is growing 30% to 35% per year, and Microrim has sold some 100,000 packages. The firm became profitable last July after 2½ years of operation. Sales doubled from $8 million for calendar 1984 to $16 million for 1985, and sales continue to increase, he says.

Microrim plans to continue to build a family of products around data base technology and charge for support, he added. "I think we can build a $100 million company on those strategies."

UNIX & 'C' ™

HANDS-ON SEMINARS 1986

A Complete Curriculum for: End Users · Management · Applications Staff · Technical Support

COURSES	LONDON	BOSTON	CHICAGO	DALLAS & SAN FRANCISCO	LOS ANGELES	NEW YORK & SOMERSET	TORONTO & ORLANDO	WASHINGTON, D.C.	TUITION	SEQUENCE TUITION†
UNIX Overview	Jan 14 Mar 11 Jun 3 Jul 29 Aug 23 Nov 18	Mar 18 Jul 8 Sep 16	Mar 11 Jul 22	Jan 28 Apr 29 Oct 21	Mar 11 Jul 22	Feb 4 Apr 15 Aug 26	Jan 28 Apr 29 Oct 21	Jan 14 Mar 11 May 20 Jul 22 Sep 30 Nov 18	$225	$860
UNIX Fundamentals for Non-Programmers*		Mar 19-21 Jul 9-11 Sep 17-19	Mar 12-14 Jul 23-25	Jan 29-31 Apr 30-May 2 Oct 22-24	Mar 12-14 Jul 23-25	Feb 5-7 Apr 16-18 Aug 27-29	Jan 29-31 Apr 30-May 2 Oct 22-24	Jan 15-17 Mar 12-14 May 21-23 Jul 23-25 Oct 1-3 Nov 19-21	$735	
UNIX Fundamentals for Programmers*	Jan 15-17 Mar 12-14 Jun 4-6 Jul 30-Aug 1 Sep 24-26 Nov 19-21	Mar 31-Apr 2 Jul 14-16 Sep 22-24	Mar 17-19 Jul 28-30	Feb 3-5 May 5-7 Oct 27-29	Mar 17-19 Jul 28-30	Feb 10-12 Apr 21-23 Sep 8-10	Feb 3-5 May 5-7 Oct 27-29	Jan 20-22 Mar 17-19 Jun 2-4 Jul 28-30 Oct 6-8 Dec 1-3	$735	$1125
Shell as a Command Language*	Jan 20-21 Mar 17-18 Jun 9-10 Aug 4-5 Sep 29-30	Apr 3-4 Jul 17-18 Sep 25-26	Mar 20-21 Jul 31-Aug 1	Feb 6-7 May 8-9 Oct 30-31	Mar 20-21 Jul 31-Aug 1	Feb 13-14 Apr 24-25 Sep 11-12	Feb 6-7 May 8-9 Oct 30-31	Jan 23-24 Mar 20-21 Jun 5-6 Jul 31-Aug 1 Oct 9-10 Dec 4-5	$490	
'C' Language Programming*	Feb 24-28 May 12-16 Jul 14-18 Sep 8-12 Nov 3-7	Apr 7-11 Jul 21-25 Sep 29-Oct 3	Mar 31-Apr 4 Aug 4-8	Feb 10-14 May 12-16 Nov 3-7	Mar 31-Apr 4 Aug 4-8	Feb 17-21 Apr 28-May 2 Sep 15-19	Feb 10-14 Apr 12-16 Nov 3-7	Jan 27-31 Mar 31-Apr 4 Jun 9-13 Aug 4-8 Oct 13-17 Dec 8-12	$1225	
Shell Programming*	Jan 22-23 Mar 19-20 Jun 11-12 Aug 6-7 Oct 1-2	Apr 14-15 Jul 28-29 Sep 6-7	Apr 7-8 Aug 11-12	Feb 17-18 May 19-20 Nov 10-11	Apr 7-8 Aug 11-12	Feb 24-25 May 5-6 Sep 22-23	Feb 17-18 May 19-20 Nov 10-11	Feb 3-4 Apr 7-8 Jun 16-17 Aug 11-12 Oct 20-21 Dec 15-16	$490	$1125
Using Advanced UNIX Commands*	Jan 29-31 Apr 9-11 Jun 18-20 Aug 13-15 Oct 8-10 Dec 3-5	Apr 16-18 Jul 30-Aug 1 Sep 8-10	Apr 9-11 Aug 13-15	Feb 19-21 May 21-23 Nov 12-14	Apr 9-11 Aug 13-15	Feb 26-28 May 7-9 Sep 24-26	Feb 19-21 May 21-23	Feb 5-7 Apr 9-11 Jun 18-20 Aug 13-15 Oct 22-24 Dec 17-19	$735	
UNIX Internals	Feb 17-20 Apr 28-May 1 Jul 7-10 Sep 1-4 Oct 27-30	Apr 21-24 Aug 4-7 Oct 13-16	Apr 14-17 Aug 18-21	Feb 24-27 Jun 2-5 Nov 17-20	Apr 14-17 Aug 18-21	Mar 3-6 May 12-15 Sep 29-Oct 2	Feb 24-27 Jun 2-5 Nov 17-20	Feb 10-13 Apr 14-17 Jun 23-26 Aug 18-21 Oct 27-30	$1375	
UNIX Administration*	Feb 12-14 Apr 23-25 Jun 30-Jul 2 Aug 27-29 Oct 23-25 Dec 17-19	Apr 29-May 1 Aug 12-14 Oct 21-23	Apr 22-24 Aug 26-28	Mar 4-6 Jun 9-11 Dec 2-4	Apr 22-24 Aug 26-28	Mar 11-13 May 20-22 Oct 8-10	Mar 4-6 Jun 9-11 Dec 2-4	Feb 18-20 Apr 22-24 Jul 8-10 Aug 26-28 Nov 4-6	$735	
Advanced 'C' Programming Workshop*	Mar 3-4 May 19-20 Jul 21-22 Sep 15-16 Nov 10-11	May 5-6 Aug 18-19 Oct 27-28	Apr 28-29 Sep 8-9	Mar 10-11 Jun 16-17 Dec 8-9	Apr 28-29 Sep 8-9	Mar 17-18 Jun 2-3 Oct 13-14	Mar 10-11 Jun 16-17 Dec 8-9	Feb 24-25 Apr 28-29 Jul 14-15 Sep 8-9 Nov 10-11	$490	$1125
Advanced 'C' Programming Under UNIX*	Mar 5-7 May 21-23 Jul 23-25 Sep 17-19 Nov 12-14	May 7-9 Aug 20-22 Oct 29-30	Apr 30-May 2 Sep 10-12	Mar 12-14 Jun 18-20 Dec 10-12	Apr 30-May 2 Sep 10-12	Mar 19-21 Jun 4-6 Oct 15-17	Mar 12-14 Jun 18-20 Dec 10-12	Feb 26-28 Apr 30-May 2 Jul 16-18 Sep 10-12 Nov 12-14	$735	
Berkeley Fundamentals and 'csh' Shell*	Feb 3-7 Apr 14-18 Jun 23-27 Aug 18-22 Oct 13-17 Dec 8-12	May 12-16 Aug 25-29 Nov 3-7	May 5-9 Sep 15-19	Jun 23-27 Dec 15-19	Feb 3-7 May 5-9 Sep 15-19	Mar 31-Apr 4 Jun 9-13 Dec 15-19	Jun 23-27 Dec 15-19	Mar 3-7 May 5-9 Sep 15-19	$1225	

*Including hands-on training workshops ™UNIX is a trademark of Bell Laboratories †Savings for consecutive seminar dates

Call for details on:

- On-Site Seminars
- Video-Based Training
- Interactive Videodisc Training

Whether you are training 2000, 200, or two . . . you can select the most efficient and economical training solution for your unique environment.

To reserve your seminar space now, or for your free 48-page course catalog call (800) 323-UNIX or (312) 987-4084.

COMPUTER TECHNOLOGY GROUP

Telemedia, Inc.
310 S. Michigan Ave., Chicago, IL 60604
The Leading Independent UNIX System Training Company

AT&T tool runs MS-DOS, Unix simultaneously

By Douglas Barney

ATLANTA — AT&T Information Systems is scheduled to release Simul-Task this month, about six weeks behind the original shipping schedule. The system software, formerly called Unix/OS Merge, allows Microsoft Corp. MS-DOS applications to run simultaneously with Unix applications on AT&T microcomputers.

Simul-Task, demonstrated at Comdex/Spring '86 in Atlanta along with several other AT&T introductions, currently runs only on the AT&T PC 6300 Plus, a microcomputer based on the Intel Corp. 80286 microprocessor. AT&T maintains that the multitasking benefits of Simul-Task can greatly increase a user's productivity. A user could, for example, receive electronic mail while running a data base application and write a report.

In addition, AT&T claims that corporate developers can use Simul-Task to modify existing MS-DOS applications using Unix commands. Simul-Task also has features such as unattended job scheduling and software-based security that typically are unavailable within MS-DOS.

At Comdex/Spring, the firm also displayed the AT&T PC Image Director, an integrated graphics software and hardware package that allows users to scan, view, edit, store, send and print a variety of documents. It includes a document scanner, scanner interface board, high-resolution monitor, graphics board and PC Image Director Software. A complete system costs $2,835.

In addition, AT&T showed, and said it plans to introduce, an Enhanced Memory Expansion Board that provides 2M bytes of random-access memory for the AT&T PC 6300. The board supports expanded memory for MS-DOS applications and allows AT&T Unix System V applications to use the additional memory.

HAL: Easier than 1-2-3

From page 19

ros that are just straight documentation of what you're doing," Gross remarked.

Throughout all of this, HAL was designed to stay sensitive to a given context — you can say "copy this" and get an appropriate response. Help features keep this sensitivity and can "actually generate the words you can continue the sentence with," Gross said.

HAL will be sold as a stand-alone product for 1-2-3 releases 1A and 2 this fall. This is about a year after the previous version was scheduled to ship, leading those with suspicious minds to ask whether it's development or marketing that is causing all the delays.

Naturally, Lotus officials would not comment on pricing or on some technical details such as how much memory HAL requires. (The first version, which was weeks away from shipment when Lotus bought the Gross' firm, took up 120K bytes.)

> ❞
>
> ***Dan Bricklin, developer of Lotus' Visicalc, raised the crucial question about HAL's add-on role: "Couldn't you provide the whole thing with one metaphor?"***

However, Dan Bricklin, developer of Lotus' Visicalc, raised the crucial question about HAL's add-on role: "Couldn't you provide the whole thing with one metaphor?"

Two answers

Why not make it part of 1-2-3? Lotus responded with two answers.

First, the company doesn't want to struggle through another major release of 1-2-3 this year. And second, some people just won't want to buy HAL. Trying to underline that point, one official said that it makes sense for users to learn 1-2-3 before moving to HAL.

But that's nonsense from a design point of view. (*First*, we'll teach you about simple commands like "/prlpo," and *then* we'll get to the difficult stuff like "print this.")

Selling HAL as an add-on would generate additional revenue, and Lotus is not in the business of continually revising its software and selling it as inexpensively as possible. Lotus shouldn't be; that's a role for riverboat gamblers like Borland International, Inc.

Lotus, instead, is grappling with the task of trying to get two million people to move roughly in step, without ever quite putting their wallets back in their pockets.

As 1-2-3 has become *the* environment for financial analysis software, competitors starting over from scratch (like Javelin Software Corp.) are bucking a riptide, however well-crafted their software.

And there's a never-ending parade of 1-2-3 add-ons, ranging from the ridiculous (or at least humorous, like Solar Systems Software's Templates of Doom) to the potentially sublime (like General Optimization's What's Best programming software). In these cases, add-ons are the way to go.

But from a user's point of view, omitting HAL from the next major release of 1-2-3 makes no sense at all.

• ADVERTISEMENT • ADVERTISEMENT •

Directories List 42,000 DP Users

Each directory of computer installations lists 10,000-16,000 computer users covering the NY Metro Area (NY, NJ & CT), the Mid-Atlantic States (PA, VA, MD, DC, WV & DE), and the New England area (MA, ME, NH, RI & VT) Each site includes a profile of the hardware installed, software installed, (languages, databases, etc.), consultants used, future plans, applications and DP executives' names, titles, and phone numbers. An index provides quick access to 133 cross references by hardware, software and industry. Price: NY-$560, MA-$395, and NE-$395. Call (212) 683-0606. Computer Management Research, Inc. 20 Waterside Plaza, NY, NY 10010.

New SYNCRA™ Software lets
IBM and DEC computers
interchange batch files
anytime,
anyplace,
saying twice as much
in half the time,
with fewer mistakes,
at half the price.
Even after everyone's gone home.

It's worth a call.
1-800-448-3400, Ext. 180.

EASTCOM
A Kodak Company

File-transfer software for compatibles
and the incompatibles.

Ask for a free R.O.I. analysis, details on available SYNCRA Software packages, or an appointment with an EASTCOM sales representative. Use our number above. Or write us on your letterhead: EASTCOM, Dept. 180, P.O. Box 10394, Rochester, NY, 14610.

SYNCRA is a trademark.
© Eastman Kodak Company, 1986, Eastman Communications (EASTCOM), A Kodak Company.
IBM is a trademark of International Business Machines Corp. DEC is a trademark of Digital Equipment Corp.

Dbase tracks crime on-line

From page 19

files and see if they are calling anyone in our target or suspect file and, if so, immediately provide an indentification on the number that the bad guy called."

Although the Florida Department of Law Enforcement has other computer systems, its agents rely most heavily upon Dbase for help in investigations. "From what we would call a tactical data processing level, the only thing we are really doing is Dbase," Pennington says.

Dbase III Plus, which shipped in January, has many features not found in Dbase III. These include the ability to run on local-area networks, new commands for programmers and the Assistant, a menu-driven interface with relational capabilities that was formerly available mainly as a teaching tool for Dbase, without relational ability. With the new Assistant, users can update, create and obtain information without using the Dbase programming language.

Enhanced programming

Pennington is most interested in the enhanced programming capabilities. "I moved up to Dbase Plus because I wanted to know what it would do," he says. "I upgraded as almost an automatic procedure to see what was new in Dbase."

The special agent says he found several new commands that make the upgrade worthwhile. "One command that is so simple that just jumped out at me immediately (that I thought Dbase needed years ago) was the On Error command, which allows you to write a routine to have something happen when the operator makes an error. In the past, a lot of times if you made an error, then the program would just bomb."

While not all Dbase applications are as exciting as chasing criminals, each serves an important function for users, such as First Bank System, Inc., a Minneapolis-based bank holding company.

"We do a lot of mass mailings where people will store customer files for a mailing," says Donna Staats, manager of the micro center for First Bank System. "And we use it here in the micro center. We have had about 1,800 students come to our training classes, so we maintain a large student data base where we keep information about what kind of classes students have gone to, when they have been scheduled and so on. We also produce our billing at the end of the month from that."

Networking needs

First Bank System is now upgrading to Dbase III Plus, in large part to meet future networking needs. "Since we are going onto the networks, we want to make sure that we don't have to rewrite all our programs, and yet we wanted a data base that would work in a local-area network environment. That didn't give us a whole lot of choices," Staat says.

Perhaps the biggest selling point for Dbase III Plus is the already widespread use of Dbase II and III. "We have set standards so we can say to our employees, 'This is the standard. This is the package that the micro center is going to support. This is the package you can get training for,' " Staat says.

Another Dbase III Plus fan is Les Helgeson, senior training specialist for Beatrice Food Co. of Chicago, who has only minor reservations about the product. "Dbase III Plus has some significant benefits over Dbase III that I am trying to get across to people." Helgeson particularly likes the View capability, under which up to 10 files can be viewed simultaneously.

Multiple relationships

However, Helgeson hopes that Ashton-Tate will improve the product's ability to handle multiple relationships so that he can compare data from more than two files simultaneously. "Multiple relationships are the key to most applications, and Dbase III doesn't handle them real well. Dbase III Plus doesn't do an excellent job either, but at least it is better," Helgeson says.

What Helgeson likes most about Dbase III Plus is the menu-driven interface and its ability to run on local-area networks. "We have one group right now that is implementing a network and is looking for software that will work on the network. I am sure they will be using Plus on their small system," Helgeson says.

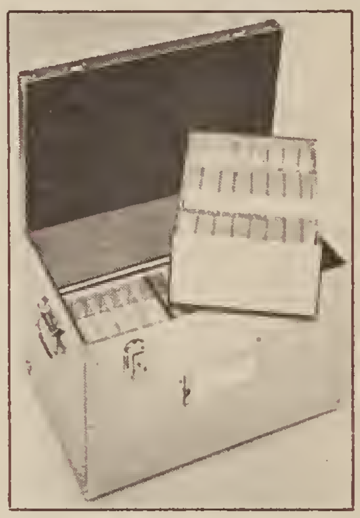
Ashton-Tate's upgrade policy makes it relatively painless for Beatrice to convert. Under this program, customers can upgrade a minimum of 25 copies of Dbase or 25 copies of Framework for $75 each, and the customer does not have to return the original disks or documentation as long as these are destroyed.

Dbase III Plus is a popular product. Ashton-Tate sold more than $20 million worth of Dbase III Plus in its first month in January, and more than 300,000 of the original Dbase III have been sold since that product debuted in June 1984. But corporate customers still have complaints.

"Get rid of copy protection; it is the most bothersome part of the whole thing," says Dave DeVries, senior systems analyst with First Bank System.

Ashton-Tate officials respond that they are seriously considering the removal of copy protection.

ALUMINUM
3480 Cartridge Cases



Model No.	Capacity
5105	1 to 26 Cartridges
5106	1-"20 Pack" Tray
5109	1 to 32 Cartridges Includes 2 removable trays 16 capacity each
5216	2-"20 Pack" Trays (40 cartridges)
5217	4-"20 Pack" Trays (80 cartridges)
5129	1 to 64 Cartridges Includes 4 removable trays 16 capacity each

See your local dealer, or call/write —
DIVISION OF BY-LO MFG., INC.
ALUMINUM CASE CO.
3333 W. 48th Pl. • Chicago, Illinois 60632 (312) 247-4611

BUILDING
A COMPUTER
CENTER?

If you're planning a new, expanded or remodeled DP facility, you need Datasphere's help.

Since 1968 Datasphere's unique combination of services has saved dollars, frustration and time for large and small firms around the world.

From turnkey—design/build computer rooms to consultation on the smallest project, we'll do all or part—on schedule, within budget! Datasphere is unique—we're engineers, consultants, planners and builders specializing in computer facilities.

Datasphere's engineers are expert in all computer support systems including:

- *Uninterruptible Power Systems*
- *Computer Power Centers*
- *Computer Fire Protection Systems*
- *Computer Type Air Conditioning*
- *Gas Turbines/Diesel Generators*
- *Operation Command Centers*
- *Elevated Flooring*
- *Frequency Converters*
- *Line Filters*
- *Security Systems*
- *Systems Monitors*
- *Voltage Regulators*

CALL DATASPHERE

800-221-0575
IN NEW JERSEY CALL: 201-382-2300

datasphere, Inc. *1255 Westfield Avenue, Clark, New Jersey 07066*

DEC®
RENT • BUY • UPGRADE • SELL

...IN STOCK...
USED VAX® SYSTEMS
750/780/785

New 1986 Catalog available on request.

BROOKVALE ASSOCIATES...Our 12th Year
WEST COAST: 800-252-6200
In WA State 206-392-9878
1495 N W Gilman Blvd Issaquah, WA 98027
EAST COAST: 800-645-1167
In NY State 516-273-7777
265 Oser Ave., Hauppauge NY 11788
TWX: 510-228-7319

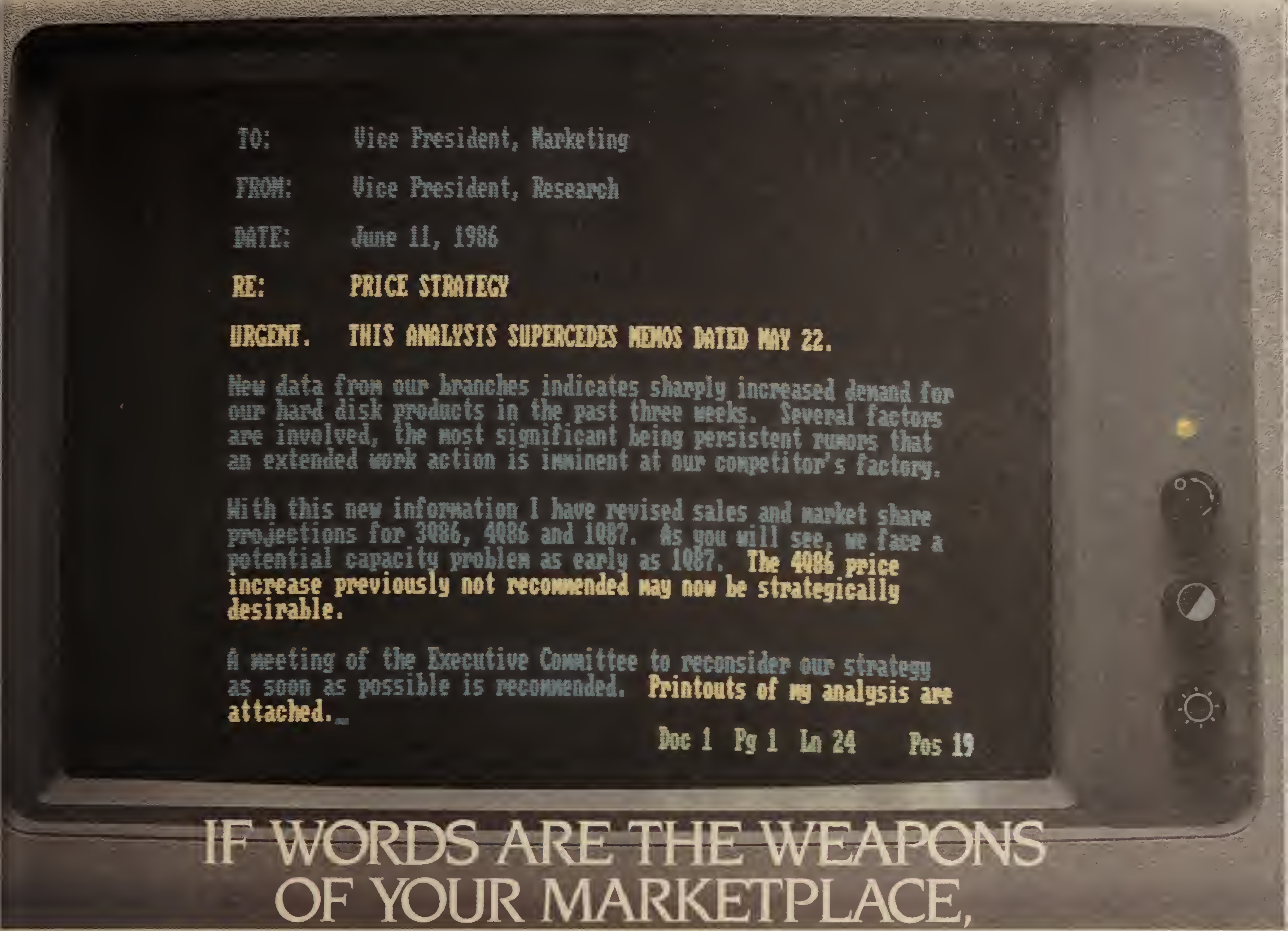
DEC, VAX & PDP-11 are registered trademarks of Digital Equipment Corp

TSO
SUPERSET-UTILITIES
IS THE
BEST ALTERNATIVE
TO IBM

▌ COPY	-	Powerful Syntax
▌ COMPARE	-	Horizontal, Vertical
▌ FORMAT	-	Word Processing Features
▌ HELP	-	Converts TSO Help to Full-Screen
▌ LIST	-	File Listing for Full-Screen or Line Terminals
▌ LISTJES	-	SYSOUT Previewer (JES2 & JES3)
▌ MERGE	-	Powerful Syntax
▌ PRINTDS	-	Full-Screen Selection Menu
▌ TSO SORT	-	Full-Screen Sort Paramenter Menu

▌ Full Clist Support
▌ User Exit Facility
▌ 132 Column Support
▌ JTIP Interface

Write or Call for Details:
Applied Software, Inc.
840 U.S. Hwy. #1, Suite 250
North Palm Beach, Florida 33408, (305) 626-4818
OVER 400 TSO CUSTOMERS WORLD WIDE



TO: Vice President, Marketing

FROM: Vice President, Research

DATE: June 11, 1986

RE: PRICE STRATEGY

URGENT. THIS ANALYSIS SUPERCEDES MEMOS DATED MAY 22.

New data from our branches indicates sharply increased demand for our hard disk products in the past three weeks. Several factors are involved, the most significant being persistent rumors that an extended work action is imminent at our competitor's factory.

With this new information I have revised sales and market share projections for 3Q86, 4Q86 and 1Q87. As you will see, we face a potential capacity problem as early as 1Q87. The 4Q86 price increase previously not recommended may now be strategically desirable.

A meeting of the Executive Committee to reconsider our strategy as soon as possible is recommended. Printouts of my analysis are attached.

Doc 1 Pg 1 Ln 24 Pos 19

IF WORDS ARE THE WEAPONS OF YOUR MARKETPLACE, IT'S TIME YOU GOT A SHERMAN TANK.

Funny, how so much rides not on what is said, but how it's said. And everything seems to come down to just one thing—the way it looks on paper.

That's why a new OKIDATA MICROLINE® 290 series printer is the best weapon in the war of the words. Both the 292 and wide-carriage 293 are designed specifically for today's computer systems that demand high-resolution text and graphics at "need-it-yesterday" speed.

The MICROLINE 290's deliver. Because they're **faster** than other leading printers in their price range. And we can prove it.

In a recent comparison we lined up the MICROLINE 292 against the IBM Proprinter and the Epson® FX286.

The IBM and Epson require **two** passes of the printhead to produce crisp, clear Near Letter Quality.

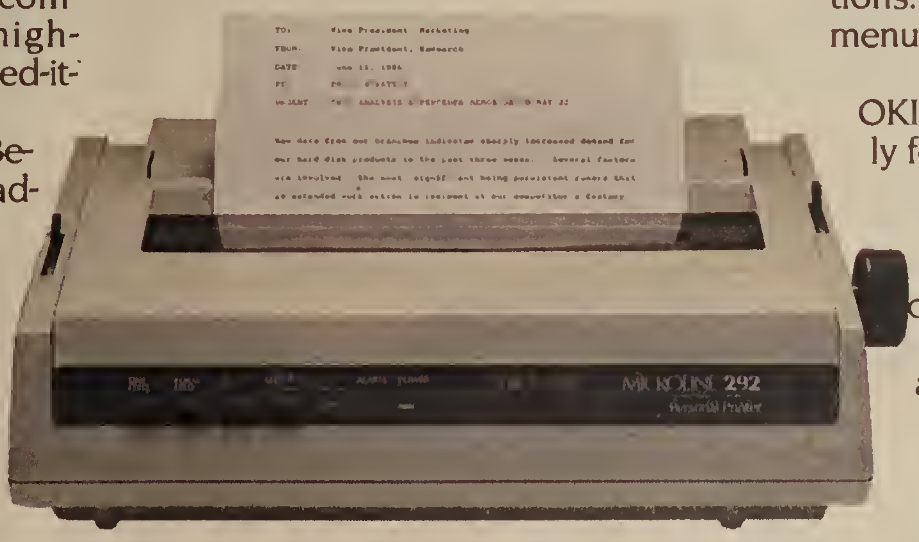
The MICROLINE 290's, on the other hand, feature our unique Dual-Nine printhead that requires only **one** pass to produce high quality NLQ performance. The result? After four hours of continuous Near Letter Quality printing, the Epson printed only 181 pages, the IBM, 215. **But the MICROLINE 292 was the clear winner with 545 pages!**

It's a winner in other ways, as well! With a wide carriage on the MICROLINE 293 for 16" spreadsheets. Color capability for impressive reports and presentations. Versatile paper handling. And a menu for feature selection that's as easy to order from as pointing a finger.

OKIDATA printers are made especially for most PC's, too. Whether it's an IBM®, AT&T®, or COMPAQ®, your OKIDATA is fully compatible.

A slingshot was a terrific weapon once. But it's no match for today's big guns. When the battle lines are drawn, draw on an OKIDATA.

For the dealer nearest you, call 1-800-OKIDATA today.



OKIDATA®
an OKI AMERICA company
We put business on paper.

OKIDATA is a registered trademark of Oki America, Inc. Marque déposée de Oki America, Inc. MICROLINE is a registered U.S. trademark of Oki America, Inc. IBM is a registered trademark of International Business Machines Corp. AT&T is a registered trademark of American Telephone & Telegraph, Inc. Epson is a registered trademark of Epson Corporation. COMPAQ is a registered trademark of COMPAQ Computer Co.

© 1986 Qume Corporation
TeleVideo, Wyse and IBM are registered trademarks.

It took vision to create an instrument so versatile it could go from boogie to Bartók.

QVT 119 PLUS. Music to your eyes.

In 1840, A.J. Sax created the potential for musical forms he'd never even heard. We give you the same kind of potential with the new QVT 119 PLUS™. The most powerful ASCII terminal you can buy. And the most beautiful.

So make your own kind of music. Dual microprocessors give you more speed than you'll ever need. And the ability to support two hosts lets you retrieve and manipulate data almost any way you want.

Software compatibility includes TeleVideo, IBM 3101, and emulation of the Wyse WY-50.

You also get the power of 44 programmable functions. Double-high, double-wide characters. Horizontal scrolling. 80 or 132 columns. Four pages of memory.

And with the resources of ITT Qume behind you, you have the backing of a full orchestra. To find out more, call 800-223-2479 or write 2350 Qume Drive, San Jose, CA 95131. ITT Qume. The company with peripheral vision.

ITT QUME

pheral vision

Come back.

T1 speed.

It doesn't have to be as scary a project as everyone thinks. Fact is, installing T1 can be a fairly simple chore.

We're Infotron.

We design, build, and install communications networks. Reliable. Compatible. Sophisticated T1 networks that support data and compressed digital voice.

Our newest system, InfoStream™, introduces an open architecture to T1 networking based on Infotron's long-established strengths in multiplexing and switching.

We'll take care of you every step of the way. Before. During. And after the sale.

Calm down. Dust yourself off. Then call: 800-345-4636.

See us at ICA, Booth #322. And at NCC, Booth #A1220.

INFOTRON SYSTEMS

COMMUNICATIONS

DATA STREAM
Robert Silverstein

Mixing public data nets, SNA

More and more companies are supplementing their leased-line-based data communications networks with packet switching network services. Public data networks offer cost advantages over leased lines, particularly for companies in which terminals are scattered over a large geographic area, at sites that generate light data traffic.

However, users who are considering using public data networks in conjunction with a leased-line network should be aware of the protocol compatibility issues involved. While this column concentrates on considerations that apply to Systems Network Architecture (SNA) networks, the integration of other vendor network architectures with public data networks involves the same type of approach.

The basic problem is how to interface X.25 packet switching protocols with the asynchronous, bisynchronous, or Synchronous Data Link Control (SDLC) protocols used by the host and terminals.

Several approaches have been used. The most simple method, in terms of the changes required of the terminals and host, is to use packet assembler/disassemblers at terminal and host

See **MIXING** page 35

Silverstein is a senior consultant in the architectures and protocols group at Network Strategies, Inc. in Fairfax, Va.

Telecom firms lure investors

Start-ups with new ideas seen as hot prospects

By Stanley Gibson

"When you've got an industry in turmoil, you've got a great opportunity for investment," said Robert Morrill, a general partner with Hambrecht & Quist in Wellesley, Mass.

Morrill was referring to the telecommunications market, where divestiture has saddled users with new problems that require new kinds of products. Start-up companies are scrambling to fill those needs as well as to address specialty niches created by the convergence of computer and communications products, he said.

While the computer industry has at least temporarily lost its attraction for many venture capitalists, investment in the telecommunications arena continues to grow at a steady pace, according to an upcoming report, "Trends in Venture Capital," to be published by Venture Economics of Wellesley Hills, Mass.

"Venture capitalists are financing local-area network component companies. That's where the action is," a Venture Economics spokesman said. He added that the major players in the market have already been decided so that growth will center on companies that supply equipment that the market leaders will incorporate into their systems. The Venture Economics study also shows strong investment in fiber-optic companies, satellite companies, multiplexer makers and consulting firms.

"The divestiture of AT&T, coupled with deregulation of all customer-premise products and services and most common-carrier services, has created an environment of explosive growth. We're looking at a market that will be $150 billion to $200 billion by the early to mid-1990s," said Dixon Doll, a telecommunications consultant and manager of the Accel Telecommunications Fund.

According to Doll, the Accel fund has

See **TELECOM** page 34

TRW to resell Banyan products

By Elisabeth Horwitt

In a strategic alliance that meshes their complementary product and marketing strengths, Banyan Systems, Inc. and TRW, Inc.'s Information Networks Division recently signed an OEM agreement for TRW to resell Banyan products as part of TRW's networking product line.

"We both think it's a very compatible relationship," said Banyan President David Mahoney. The products have already been working together for several months, he noted. On a departmental or work group level, Banyan's server offers a choice of IBM Personal Computer networking options. PCs can be linked directly to the server or through one of several micro networks supported by Banyan.

On the corporate networking level, TRW's Concept 2000 boards, installed in the expansion slots of Banyan servers, provide a broadband backbone that links multiple departmental PC networks into one communications system, Mahoney said. Banyan also provides gateways to IBM and asynchronous hosts. "We are providing products that significantly extend TRW's range of network offerings," Mahoney claimed.

Banyan also benefits from the agreement by gaining access to TRW's customer base of large government organizations and corporations, Mahoney noted. Responding to such companies' requests for quotations requires "a large upfront and

See **TRW** page 32

NEW THIS WEEK

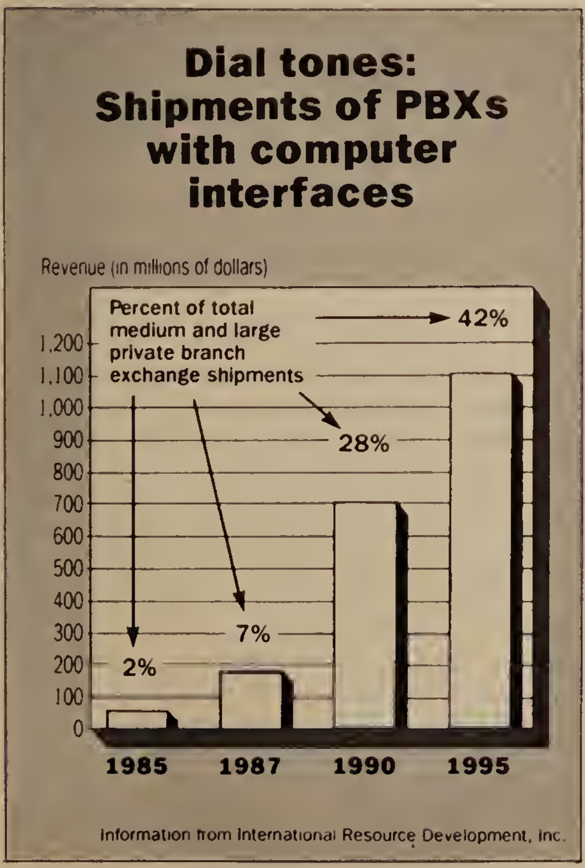
- GTE enhances its Starlog system
- For more on this and other new products, see pp. 81-104.

INSTANT ANALYSIS

"For ISDN to work, there has to be an end to finger pointing; vendors have to assume end-to-end responsibility beyond the demarcation line where their technical responsibility ends."

— Patrick Krause, telecommunications director, McDonald's Corp., at Comten Users Exchange meeting

PABX-computer links on rise


Dial tones: Shipments of PBXs with computer interfaces

Information from International Resource Development, Inc.

MITCHELL J. HAYES

T1 links earmarked for 200% growth rate

By Elisabeth Horwitt

NORWALK, Conn. — A growing demand for T1-based computer-to-private branch exchange interfaces should give the voice/data private automatic branch exchange (PABX) systems market a much-needed shot in the arm, according to a recently published report from Norwalk research firm International Research Development, Inc.

The report forecasts a 200% annual revenue growth rate for PABXs equipped with such interfaces; approximately the same growth rate that International Research Development predicts for T1 links, senior consultant Leslie Townsend said. She added that the demand for T1 links will continue to rise, "whether or not Integrated Services Digital Network

See **PABX** page 35

ETL to assume certification service for IBM Cabling System

By Elisabeth Horwitt

CORTLAND, N.Y. — The Network Cable Certification Program, a service that tests whether cable products meet IBM Cabling System specifications, is now being administered by ETL Testing Laboratories, Inc. of Cortland, an ETL spokesman said last week. The service will supercede IBM's own qualification program, with the two programs overlapping until May 31 to provide a smooth transition, ETL said.

Close supervision and quality assurance is important "because the high bandwidth requirements of IBM's Token-Ring network will stretch copper cable to its performance limits," said James Williams, vice-president of business operations at ETL. IBM has researched different types of copper cable construction that can carry large masses of data, including a foam-insulated, twisted-pair copper conductor that reportedly could support 20M bit/sec. data rates, he added.

Several different types of copper cable that IBM had specially designed for its Token-Ring network are "very closely rated for impedance, cross talk, signal attenuation, capacitive imbalance," Williams said. "We will be closely observing participating cable manufacturers for performance and quality to ensure that they meet those specifications."

The program is open to all manufacturers of network cable designed to meet IBM specifications, Williams said.

ETL employees will perform weekly factory inspections during which samples will be taken for laboratory testing. Cable that ETL inspectors find to be up to stan-

See **ETL** page 32

TRW to resell Banyan products

From page 31

long-term investment from the supplier in terms of network planning, development, training and support," according to Mahoney. "Banyan does not have the resources to target this market; TRW does. They're letting a little company play in a big field."

TRW chose Banyan products for their versatility, according to TRW's general manager of information networks, J. Edward Snyder. "The server uses an IBM PC backplane, so that it can link into 3Com Corp., Sytek, Inc., IBM's Token-Ring, any network that has an IBM PC interface. They just have to write the software driver. If the customer already has a 3Com network, we can protect his investment." Adding Banyan networking products to its own line should strengthen TRW's position in the systems integration arena, he explained.

He added that TRW estimates systems integration revenue will be $15 million this year. "As a turnkey supplier to large organizations that need a lot of PCs, data base and peripheral sharing, we need to offer a range of products — and we can't invent them all ourselves."

Paul McHugh, manager of network services at TRW customer Cleveland Clinic Foundation, Inc., agrees with McHugh's assessment. "The TRW-Banyan alliance gives TRW an edge in the networking market that their products formerly lacked, especially in the PC arena," he commented.

Approximately a year and a half ago, Cleveland Clinic installed a broadband network based on TRW's Concept 2000 boards. "We are in the process of switching" from a Burroughs Corp. to an IBM mainframe, McHugh said. "The network enables users to get used to accessing an IBM host while still retaining access to the Burroughs."

The network also supports the clinic's surveillance security system and may support voice communications in the future, McHugh noted.

Cleveland Clinic became a beta test for TRW's newly integrated Banyan product line because "many of our departments use IBM PCs a lot," McHugh said. The company has approximately 100 Personal Computers now and expects to have 400 to 500 by the end of the year. Banyan's server, connected to TRW's broadband network, enables IBM PC users to "maintain their own files and access mainframe files that have been downloaded to the server," McHugh said.

Eliminating the need for direct micro-to-mainframe connections saves Cleveland Clinic the cost of equipping each micro user with an IBM 3270 terminal emulation board and also avoids overloading the host with user data requests, he explained.

Download from a VAX

Departmental users also will be able to access medical diagnostic data that has been downloaded to Banyan servers from the clinic's Digital Equipment Corp. VAX, McHugh added. "This will eliminate the need to supply IBM PCs with asynchronous terminal emulation boards."

The clinic currently is testing one Banyan server in prototype mode, McHughs said, "to see if it does everything we want it to do. If it's cost-justifiable, as seems likely now, we will install 40 to 50 servers around July 1." The clinic is still unsure whether Personal Computers will be linked directly to Banyan servers or over Ethernet networks.

Integration of Banyan and TRW's product lines provides customers with a wider range of networking choices, Mahoney commented. "PCs can be clustered, or linked over an Arcnet or Corvus Omninet at the departmental level; then the various networks can be linked over a broadband backbone." Banyan also provides IBM mainframe gateways.

The contract with Banyan is the second of its kind for TRW. Late last year, the company agreed to sell Bridge Communications Corp.'s Ethernet-based communications servers and gateways. TRW and Bridge are also jointly working on gateway products.

"Some additional minor OEM agreements are in the works, but Bridge and Banyan are the main ones for now," Snyder said. The three companies' network offerings together should answer 80% to 90% of all customers' connectivity needs, he added. "The rest involves more specialized products like satellite links or laser bridges." TRW's next major agreement should be with a wide-area networking vendor, Snyder noted.

ETL to assume service

From page 31

dard will be marked every few inches, "to assure users that their cable meets all IBM specifications for local-area network system performance," he added.

Among the types of IBM network cable certified by the program are Type 1, two twisted pairs designed to carry data only; Type 2, two twisted pairs for data and four twisted pairs for voice; Type 6, patch-panel data cable; Type 8, under-the-carpet data cable; and Type 9, two twisted pairs carrying data only.

"As far as we know, these cable types are what IBM is specifying to be used in its current network," Williams said. "As other cable is introduced into the net, we'll be certifying it. IBM won't say what type of cable that will be; you know IBM."

Save 12 Months of Wasted Effort.

Attend a free 4-hour 4GL/DBMS Seminar

12 months after you purchase a DBMS you'll figure out what's wrong with it. The features that looked so friendly in the demo turn out to be enemies to your programmers. Or the so-called "4GL" turns out to be just SQL or C.

So take a morning to learn what's available. System 1032® is an integrated 4GL/DBMS rich in features that let you write exactly the applications you want. Screens entirely independent of data structures, a versatile report writer, user-definable commands.

Yet it's so straightforward that end-users query the data directly, without hand-holding.

Sure, there are things System 1032 doesn't do. It only runs under VAX/VMS. It doesn't design your application for you.

But if you like what you see, you can sign up for a 60-day trial evaluation (normally $125) without charge. To register, call (617) 661-9440.

Ottawa, Canada	May 13
Montreal, Canada	May 15
St. Louis, Missouri	May 20
Indianapolis, Indiana	May 22
Minneapolis/St. Paul	June 17
Chicago, Illinois	June 19

Software House

1000 Massachusetts Avenue, Cambridge, MA 02138 (617) 661-9440

THE MARRIAGE THAT CHANGED THE SOFTWARE INDUSTRY.

In an industry that's had its share of volatility, we present an ideal partnership.

On one side of the aisle, McCormack & Dodge. A fast-growing software company known for its leading edge technology.

On the other, Dun & Bradstreet. Employer of four U.S. presidents, a symbol of financial stability for nearly a century and a half.

They exchange vows, and you've got the kind of company the business software market has been waiting for.

A software company that's not only rich in talent. But rich in resources.

Resources to train, support and service. Resources to fix a problem no matter where in the world it occurs.

Resources to fund serious long-term R&D in every field of business software. Financial, manufacturing, human resources, application development tools.

Backed by Dun & Bradstreet, today's McCormack & Dodge combines stability and innovation. Something no other software company has managed to do.

If you're planning on a new family of software, isn't this the kind of company you want to marry?

McCormack & Dodge

DB a company of
The Dun & Bradstreet Corporation

McCormack & Dodge Corporation, 1225 Worcester Road, Natick, MA 01760, 1-800-343-0325

Telecom firms lure investors

From page 31

raised some $65 million, which he said he believes is the largest source of capital solely for the telecommunications industry. Investors in the Accel fund include U.S. West, Northern Telecom, Inc., Hasler Ltd. and the pension funds of AT&T, Bell Atlantic Corp. and GTE Service Corp. as well as a number of financial institutions.

Doll said his strategy is to invest not only in start-up companies but in established companies that need follow-on financing. He said the Accel fund has concentrated its resources in the following areas: Integrated Services Digital Networks, network management, T1 multiplexers and switches, multivendor connectivity, advanced switching and communications software.

A similar project, based in San Francisco, is the Hambrecht & Quist Communications Ventures fund, which should raise $30 million to $40 million within a year, according to General Partner Cliff Higgerson.

Boston-based TA Associates has been looking for companies that sell products to divested Bell operating companies, according to Andy McLane, a TA Associates general partner. Before deregulation, the Bell operating companies purchased many products from AT&T that they now can buy from other suppliers, McLane explained.

"We're excited by the industry," McLane said, adding that TA Associates has invested in some 12 telecommunications companies in amounts ranging from $1 million to $10 million.

Some of the investors in start-ups are equipment manufacturers that desire to sell the young companies' products under their own label. Infotron Systems Corp., for example, already built low-end T1 multiplexers but desired to expand its line by adding a high-end system.

Rather than incur the cost of research and development, the company chose to invest in Network Switching Systems, Inc., an Andover, Mass., start-up that is developing a high-end T1 multiplexer. A combination circuit and packet switch, the product will handle voice, data, image and video transmissions.

Network Switching Systems has received two rounds of venture capital totaling $12 million from a variety of investors. Infotron purchased just under 20% of Network Switching Systems' stock and acquired the nonexclusive rights to market Network Switching Systems' equipment, according to Infotron President and Chief Executive Officer Jim Hahn.

Now a Network Switching Systems beta test site, Infotron has two Network Switching System units connected to T1 lines, Hahn said.

Anticipating two more beta tests this year, Network Switching Systems plans to ship products in the second quarter of 1987, according to Harry Ruda, Network Switching Systems vice-president of sales and marketing.

Variety of investment sources

Some other firms that have recently attracted investment from a variety of sources include the following:

- Netlink, Inc. The Accel fund has invested in Netlink, a Raleigh, N.C., maker of Systems Network Architecture (SNA) gateways. Netlink was founded in Australia in 1982 by several former IBM employees.

"There are lots of holes in SNA that need to be filled," said Netlink spokesman David R. McCormick. The company has so far produced an 3703 network processor and hub that links multiple Hewlett-Packard Co. devices to an SNA environment. With more than 1,000 boxes installed, Netlink had $2½ million in revenue last year and this year expects $6 million, according to McCormick.

- Advanced Business Comuunications, Inc. When Advanced Business Communications founder John Israel built a central office switch for the Italian telephone company Italtel, some private investors urged Israel to produce a similar switch for the U.S. market. The result, introduced in the spring of 1985, was the Multiple Applications Exchange. Aimed at long-distance carriers, the digital switch supports up to 24,000 ports.

The Dallas-based company recently signed an order for 10 tandem switches for the Telcore Digital Network in California, which plans to build a nationwide network to be used by long-distance carriers. Eventually, Advanced Business Communications plans to sell its equipment to corporate users.

- Quanta Communications Systems, Inc. Founded in 1982 and expecting $5 million in sales this year, Quanta of Anaheim, Calif., makes a 32-channel fiber-optic multplexer that transmits at a top speed of 64K bit/sec.

"We feel we have the top-of-the-line fiber-optic multiplexer," said Quanta founder and President Howard Rush, who also said he believes fiber-optic cable will increasingly be a medium of choice for building networks.

Quanta has OEM agreements with Racal Milgo Information Systems, Inc. of Florida and with Racal Milgo Ltd. in Great Britain. Racal Corp. owns a large percentage of Quanta stock.

One of the liveliest areas of innovation and start-up activity in the past few years has been the T1 multiplexer realm. But Doll of Accel offered the view that some of the large number of companies active in the T1 arena will not survive beyond the next few years. "The T1 mux area may not be able to go much further because it is fully populated now," he said. "There will probably be a shakeout."

MADE FOR EACH OTHER.

LAUREL & HARDY Characters © 1986 Larry Harmon Pictures Corporation. Licensed by Larry Harmon Pictures Corporation, Los Angeles, California, USA

Just like Topaz Power Conditioners and your computers.

Noise transients, voltage fluctuations, blackouts—all are problems for computers. But Topaz eliminates these problems with a full range of products: LINE 2® Power Conditioners, ULTRA-ISOLATOR® Noise Suppressors and POWERMAKER® Uninterruptible Power Systems.

Reliable. Affordable. Efficient. Our products are ideal for use with all computers, from micros to mainframes. Call us today at (619) 279-0831. After all, we're made for each other.

TOPAZ®
Excellence in Computer Power
A Subsidiary of the Square D Company

For your FREE copy of our 16" × 20" MADE FOR EACH OTHER poster, please tear out this ad and send it to us along with your name and address.
Mail to: Topaz, Inc. 9150 Topaz Way, San Diego, CA 92123-1164.

Mixing public data nets, SNA

From page 31

sites. The packet assembler/disassembler takes data off a communications line from either a host or terminal, places it in an X.25 packet and sends the packet to the nearest public data network node over a dial-up or private line.

The double packet assembler/disassembler approach may be the easiest to implement, but it does have several drawbacks. The first is response time. This will not be a problem if a packet assembler/disassembler supports only asynchronous terminals sending short messages, but be careful with bisynchronous IBM 3270 terminals where transmissions average 1,000 characters or more. Each additional piece of equipment that the message must go through will add to response time.

Implementing packet assembler/disassembler functions in a separate box also prevents the user from extending X.25 time division multiplexing capabilities all the way to the front-end processor. Instead of having multiple devices share one communications link to the front-end processor, you must have one line and port per terminal.

This leads to the next alternative, which is to implement X.25 functionality in the front-end processor. In the IBM and IBM-compatible world, there are three software products that provide this capability: IBM's Network Control Program Packet Switching Interface (NPSI); Network Access System from Comm-Pro Associates, which runs on a communications processor such as an IBM 3705 or 3725 or plug-compatible front-end processor; and NCR Comten, Inc.'s X.25 Interface to Packet-Switched Networks, which requires an NCR Comten front-end processor.

IBM's NPSI will serve to exemplify the capabilities of implementing X.25 functionality in the front-end processor. NPSI takes care of converting X.25 packets to SNA protocols, and vice versa, at the host end. If asynchronous terminals are involved, no protocol conversion is necessary at the terminal end because all public data networks support asynchronous protocols. IBM mainframes do not, however. The NPSI thus takes on the additional job of setting up dummy sessions so that the host thinks it is communicating with an SNA device.

Dummy sessions are unnecessary if the X.25-based terminal-to-host connection involves a real SNA device such as an IBM 3274 controller.

However, protocol conversion is needed before synchronous terminals can transmit via a public data network. Three options are available: a converter can be built into the SNA controller; special High-Level Data Link Control packet assembler/disassemblers can perform conversion between X.25 and SDLC; or the Network Interface Adapter, available from IBM, can be used.

The last type of device commonly found in an SNA network is the bisynchronous 3274 controller. Unfortunately, messages from bisynchronous 3270 terminals must be processed by a special VTAM program before NPSI will allow them to pass through the front-end processor to the host.

More practical alternatives include implementing on the front-end processor Comm-Pro or NCR Comten software that includes the required conversion capabilities or using the double packet assembler/disassembler approach described earlier.

As can be seen, there are a number of issues to resolve when implementing an SNA network over public data network facilities. The decision to use them can clearly save money, but beware of taking a wrong turn along the way.

PABX-computer links on rise

From page 31

starts to displace private networks."

The computer-to-PBX interfaces themselves make up only a small portion of PBX vendors' total revenues, according to Townsend. International Research Development reported $3.17 million in interface sales for 1985 and predicts sales of $24.1 million in 1995.

T1-based computer-to-PBX interfaces enable users to connect multiple terminals and hosts over 1.54M bit/sec. links, either locally or over a distance, Townsend noted. The PBX connection provides flexible switching capabilities and also enables companies to "use excess T1 capacity for voice transmission, especially during off-peak periods," she added.

An important development in this market, the report stated, is industry support of a standard computer-to-PBX interface. At this time, there are two competing standards: Computer-PBX Interface (CPI), jointly developed by Northern Telecom, Inc. and Digital Equipment Corp., and AT&T Information Systems' Digital Multiplexed Interface (DMI). According to International Research Development, CPI is the current leader with 58 PBX interfaces shipped during 1985 and approximately 100 licensed vendors.

However, the research company concluded, CPI may lose ground over the long term because it is incompatible with Integrated Services Digital Network (ISDN) specifications for clear 64K bit/sec. transmission and a separate channel for signaling. DMI's closer conformance to ISDN will prove "a more likely long-term strategy," the report said.

WE WANTED TO MAKE THE PERFECT 3270. IBM WAS A GOOD PLACE TO START.

We've always felt the IBM® 3270-PC was good.

But we've also always felt that it could be made a great deal better.

That's why we developed the Businessland 3270 series of workstations.* IBM PCs, XTs, and ATs that we've enhanced to provide more capabilities and more flexibility than their IBM predecessors.

The result is a line of personal computers that are fully functional, fully compatible desktop tools. And they remain so even while hosting conversations with your mainframe.

To learn more about our new 3270 workstations, call or stop by any of our 70 nationwide locations. And remember, Businessland offers more than just computer systems. We also give you the training, service and technical support you need to get the most out of them.

The Businessland 3270 series. We think you'll find that we used IBM's good start to make a great finish.

Features	*Businessland 3270*	*IBM 3270 PC*
Multiple Host Sessions	*Yes*	*Yes*
Windows/Notepads	*Yes*	*Yes*
IBM File Transfer	*Yes*	*Yes*
IBM API (High Level)	*Yes*	*Yes*
IBM API (Low Level)	*Yes*	*Yes*
IBM Personal Services/PC	*Yes*	*Yes*
DOS Runs In Background	*Yes*	*Yes*
Available In PC, XT & AT	*Yes*	*Yes*
Host Printer Session	*Yes*	*No*
IRMA™ Emulation	*Yes*	*No*
Available in Non-IBM PCs	*Yes*	*No*
*Upgrades For Existing PCs***	*Yes*	*No*
Internal Tape Back-up Available	*Yes*	*No*
Fundamentals Training Course	*Yes*	*No*
Memory Required (4 Sessions)	*120K*	*267K*
Slots Available (3270 PC, APA)	*4*	*2*

BUSINESSLAND®

Where business people are going to buy computers.

Call (800) 228-7463 for locations nationwide.

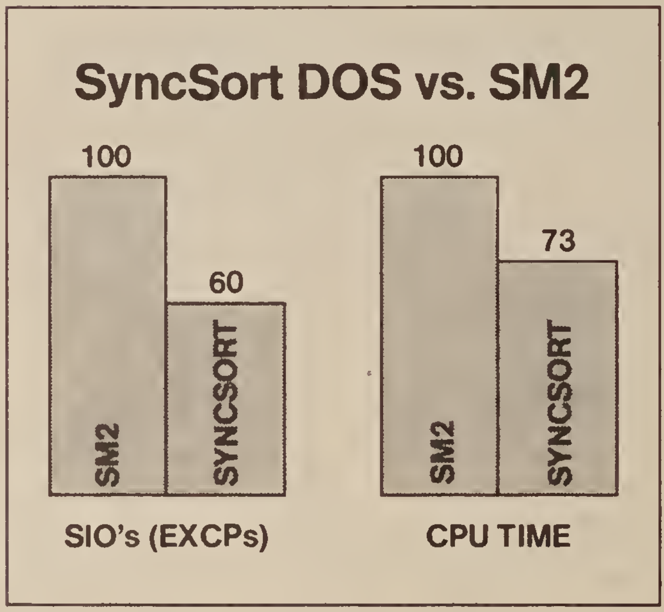
*Businessland 3270 workstations are IBM PCs, XTs and ATs specially enhanced by Businessland. IBM is a registered trademark of International Business Machines Corp. IRMA is a trademark of Digital Communications Associates, Inc. **Businessland 3270 adapter: $1,195. Businessland 3270 keyboard: $326.

SMART COOKIE

Like you, SyncSort DOS is cut from a special mold.

Call (201) 930-9700.

It's healthy for your system.



syncsort INC.

One thing about smart cookies, they can spot each other a mile away.

While they don't flaunt their derring-do, they quietly know they're the best at what they do. Because substance shows through. Every time.

Especially when the going gets tough. And rough. As it often does in a DOS environment.

For example, a smart cookie doesn't crumble under the pressure of too many programs and too few programmers.

A smart cookie doesn't waste dough — but picks and chooses the right ingredient to keep production on the rise.

And sometimes, even, a smart cookie has to be a mighty tough cookie. That means being on the job constantly. Keeping things running and humming. Without draining vital resources.

All of which brings us to our smart cookie: SyncSort DOS. A cut above the rest if you ever saw one. Check these delicious advantages.

BETTER PERFORMANCE

Pop one into your system and you'll see a mouthwatering difference. Immediately. SyncSort DOS will give you performance improvements like those shown in the chart on the left.

And performance features such as:

- **Automatic Secondary Allocation** — With this feature your sorts will never run out of disk space, i.e., no "sort capacity exceeded" messages.

BETTER FEATURES TO IMPROVE PROGRAMMER PRODUCTIVITY

As you begin to digest SyncSort DOS, you'll find it more and more to your liking. With ingredients that cut down to size the amount of programming time going into applications.

- **SortWriter** — A powerful tool that can produce extensive reports as a by-product of your normal sorting — without user exits and the associated programmer investment. Headers, trailers, total and sub-total capabilities provide flexible formatting.
- **Record Formatting** — Powerful features like INCLUDE/OMIT, INREC/OUTREC, SUM and others — with capabilities like data conversion, editing, insertion of literals.
- **Multiple Output** — From a single sorted file, you can create multiple files and reports. Each can include the same or different data as determined by INCLUDE, OMIT, OUTFIL or OUTREC parameters.

BETTER CUSTOMER SERVICE

Still another sweet advantage of SyncSort DOS: help is always there when you need it. 85% of all requests for service are resolved within 24 hours. We always rise to the occasion.

The moral to this story: smart cookies are quick to reject half-baked solutions in favor of SyncSort DOS. Call us for a demonstration. Once you get a taste you will be hungry for more.

SyncSort DOS
One smart cookie deserves another.

Syncsort Incorporated 50 Tice Boulevard, CN18, Woodcliff Lake, N.J. 07675

SOFTWARE & SERVICES

SOFTLINE
Edward Warner

Ada goes civvy with SDI boost

The Strategic Defense Initiative (SDI), a multibillion-dollar research and development effort to shoot down enemy missiles with everything from lasers to high-speed projectiles, has been attacked as a threat to world peace — and to an already swollen federal deficit. But while the merits of the SDI program are debatable, one thing is certain: It will be a boon for the Ada programming language, a language that has so far been relegated to the backwaters of military applications and academic research.

SDI will rely heavily on computers, and those computers will be running software written in the Ada language, a Department of Defense requirement for all of its computer systems. A massive number of Ada programs will be needed to implement SDI, creating a demand for Ada programmers and spreading knowledge of the currently little-known benefits of this obscure language.

Like the Jeep and radar, Ada is likely to migrate eventually from military uses to a position in civilian life that many will appreciate. Business users, in fact, will find Ada quite attractive.

Ada, you see, offers some features that are available with no other language. For one thing, it is highly portable; that is, it will run on various vendors' hardware. All that is needed to transport it between different makes of mainframe computers is a compiler, and the number of compilers is growing as interest in developing software for SDI heats up.

One vendor, Verdix Corp. of Chantilly, Va., makes eight Ada compilers for use with the variants of just one operating system, Unix.

Portability is important because it permits users to switch to cheaper or

See **ADA** page 42

Warner is editor of the Computerworld News Service.

MSA chief leads charge

Builds firm to challenge mart leaders, gain top spot

By Charles Babcock

INTERVIEW

MSA's Imlay

John P. Imlay Jr., chairman and chief executive officer of Management Science America, Inc. (MSA), has led the Atlanta-based applications company from a $2.7 million-a-year supplier in 1972 to what is projected to be a $175 million-a-year company in 1986.

If the company matches that projection from Wall Street security analysts, it will have bounced back from a slow 1985, when revenue advanced only $11 million to $152 million, or 7.8% over figures from the year before. At the $175 million mark, MSA's revenue will be up 15% over 1985, and the company will be challenging the industry leaders for a top spot in 1987. At the recent MSA users group meeting in Las Vegas, Imlay paused to tell *Computerworld* why he thinks his company will face continued strong demand for its products.

CW: Customers like your new product, Information Expert (IE), as a report writing interface to your applications. But IE is being given to your customer base. You say you spent $20 million and five years to develop it. When do you see MSA getting a return on that investment?

IMLAY: Well, we aren't marketing it as a stand-alone competitor to Focus and Ramis [development languages and data base management systems from Information Builders, Inc. and Martin Marietta Data Systems, respectively]. We were using IE as a development tool over those years. . . . We have 125 users licensing it for use with non-MSA systems for $50,000 a license, and that's more than we anticipated. We will sell Screen Painting for $50,000. But the main thing is we sell applications with it. It makes applications more attractive.

CW: You said you attracted top MIS and corporate execs to a special session this year. Why are they coming?

IMLAY: It points toward the fact that the sale is bigger, that integration is a great concern and that the total solution for these corporations is a paramount concern to the top DP person or chief information officer. . . . It's interesting that where only IBM could draw this type of crowd before,

See **MSA** page 40

SOFTWARE NOTES

Pitts leaves DG, moves to Cullinet

An associate of **David L. Chapman** at **Data General Corp.** has been named to a top position at **Cullinet Software, Inc.**, where Chapman is now president and CEO. **James A. Pitts** has been named executive vice-president of finance, administration and strategic planning. Pitts now serves as DG's controller. Chapman is the former executive vice-president of manufacturing at DG, and his arrival at Cullinet March 12 prompted the resignation of then-President **Robert N. Goldman.** In a similar manner, the arrival of Pitts has resulted in the resignation of **Phyllis S.**

See **NOTES** page 40

Rabbit reports sales agreements

By Eddy Goldberg

MALVERN, Pa. — Rabbit Software Corp., in the space of eight days, announced four sales agreements for its IBM-compatible communications and connectivity software, including one with IBM. The other three contracts are with Burroughs Corp., Tolerant Systems, Inc. and SCI Systems, Inc.

Rabbit, founded in 1982, is among a growing number of third-party vendors supplying communications and connectivity software that provides links to IBM's Systems Network Architecture (SNA). The recent deals are indicative of stepped-up efforts by non-IBM computer vendors to provide their customers with access to IBM's SNA environment.

See **RABBIT** page 42

NEW THIS WEEK

- AGS Management ports PAC III project management system to Microvax II
- Applied Data Research enhances ADR/Roscoe on-line programming system for MVS
- For more on these and other new products, see pp. 81-104.

INSTANT ANALYSIS

"A second-half 1986 capital spending upturn may be tempered by the depressed U.S. energy sector and a slowdown in foreign computer demand. Investment strategy should emphasize services companies and avoid the capital spending-sensitive software vendors."

— Prudential-Bache Securities Research recommendation in "Software Snapshots."

BIM Spotlight

BIMWNDOW

Wouldn't it be nice to have a couple more terminals on your desk?

You could eliminate the inconvenience, lost productivity, and system overhead associated with logging off and on to different applications!

BIMWNDOW permits multiple terminal sessions to be active concurrently at the same physical 3270 CRT, under **DOS** or **OS** VTAM. The user may switch back and forth **instantly** between the terminal sessions by hitting a PA or PF key. The terminal sessions may be in the same or in different VTAM-connected partitions/regions. For example, one session might be logged on to a CICS partition or to TSO to do program editing, and another session connected to a test CICS to test the application program being developed.

Call for full documentation or **free 30-day trial.**

Price: OS - $4000 or $200/mo., DOS - $2400 or $120/mo.

BIM has 15 system software products for improving productivity and use of DOS/VSE, OS, and CICS, and also performs systems programming consulting. Marketing agents in most countries.

BIM

B I MOYLE ASSOCIATES, INC.
5788 Lincoln Drive
Minneapolis, MN 55436

612-933-2885
Telex 297 893 (BIM UR)
Member Independent Computer Consultants Assn

Digital has it now.

You bought your Digital computer for the total system performance it gives you. But when it comes to terminals, the only ones that can deliver all that performance are Digital's. Because only Digital's terminals are 100% compatible with Digital's systems.*

What you gain with full compatibility is full performance – the kind that can be measured in dollars. Problems with host command response, keyboard code response, or printer port response are avoided. You also avoid the cost and inconvenience of re-writing systems and applications software and device drivers.

The only family of terminals that delivers maximum performance from your Digital system.

And since our current VT200™ family is the only one that's 100% compatible with VT52™ and VT100™ terminals, your investment in these products is protected too. Finally, Digital's terminals are backed by the worldwide service and support of a $7 billion corporation.

To find out how VT200's can give you maximum system performance at lower overall cost, write to: Digital Equipment Corporation, 129 Parker Street, PK03-1/9D, Maynard, Massachusetts 01754. Or call your local Digital sales representative or Authorized Terminals Distributor.

digital™

*VT200 Family. Source: Digital Review

© Digital Equipment Corporation 1986. Digital, the Digital logo, VT, VT200, VT52 and VT100 are trademarks of Digital Equipment Corporation.

MSA chief leads charge

From page 37

software is becoming a driving force. For the first time, clients are looking to packages more than they're looking to hardware.

CW: You have committed yourselves to interface your applications to IBM's DB2 and SQL. What would happen to a company that didn't?
IMLAY: They'd lose that potential market; in the long term, they won't have a market.

CW: With new players like Cullinet Software, Inc. in the applications market, do you find that your established products like general ledger are having trouble holding their own or that they're losing ground?
IMLAY: It's just the opposite. In the past six months, because of the acceptance of our technology, we seem to be more competitive than we have ever been. And the competition has lessened as many of the competitors have been acquired or dropped out of the foray. Uccel Corp. sold off their cross-industry accounting products to a company in Denver that we just don't hear of anymore. Walker Interactive Products, Inc. has reduced its staff to virtually nothing, and we don't hear from them anymore.

Cullinet has a very loyal customer base for its data base management system, but we see great activity on the applications side with IDMS. McCormack & Dodge Corp. is still a good competitor, but the marketplace has changed tremendously.

CW: Are you seeing an upturn in sales?
IMLAY: From October on, business has been excellent. Sales were up dramatically in the first quarter, $29 million vs. $25 million. It seemed like our business picked up as the Sierra machines were installed with that excess capacity.

CW: IBM has expressed interest in increasing software revenue. Why aren't you feeling the pressure of its presence?
IMLAY: At this stage of the game, they have gone to vertical markets, in health care, in decision support and in VM software. They have formed strategic alliances, but they have stayed away from the financial marketplace. They do compete with us in manufacturing, with COPICS and MAPICS.

CW: Aren't COPICS, or Communications-Oriented Production Information and Control System, and MAPICS, or Manufacturing, Accounting and Production Information Control System, aging products?
IMLAY: Absolutely. We love it when they compete with us there. That's the only area of a competitive nature at this time.

CW: Do the independents have an advantage over IBM in some areas?
IMLAY: The sale and installation of a sophisticated accounting product takes a great deal of service. To support applications is much more difficult than to support systems products. And at the moment, we don't see IBM coming for several years.

CW: Do you see competition coming from Japan?
IMLAY: I was just in Japan. There is no indication from either the independents or the vendors themselves, like Fujitsu, that there will be any applications software products, including manufacturing systems, coming out of Japan for many years. They have a natural resistance to packages. One of them told me, "Using someone else's code is like using someone else's underwear."

CW: Do you think Japanese companies might emerge as competitors?
IMLAY: Yes. It's logical that they would. When they grasp the concept, it is their type of business. The exacting nature of software is just like the exacting nature of the development of an electronics instrument.

CW: IBM has the technical capability today.
IMLAY: Our salvation against IBM is they don't have the business-specific knowledge. The ones that do could be potential competitors, but the ones we're making strategic alliances with are the Big Eight accounting firms. They have the business knowledge. All of our systems are involved with Arthur Andersen & Co., a joint arrangement where we provide all the systems and training for their consulting people, and jointly, we bid certain total-solution jobs.

Notes: CCA buys software firm

From page 37

Swersky, former Cullinet senior vice-president and chief financial officer.

"It is with regret we accept her resignation," said John J. Cullinane, chairman.

■

In what company officials say is a strategic move, **Computer Corporation of America** (CCA) has acquired **Multiplications Software, Inc.** of Cambridge, Mass., and its products, Imagine and Accolade, for $3.5 million. Imagine is a forms-driven, information retrieval and reporting system; Accolade is a Cobol application generator. Both will be redesigned to work with CCA's Model 204 and IBM's DB2. They currently work with IBM's VSAM and IMS. CCA officials say they will be able to offer de-

See **NOTES** page 42

Every year, American businesses lose an estimated $3 billion due to computer crime.* And as personal computers and distributed processing gain momentum, the problem of protecting mainframe computer resources will become even more critical.

That's why so many data centers have already installed ACF2 Access Control Facility software. In fact, ACF2 software has become the leading security software solution for IBM mainframes today, with more than 1,800 installations worldwide.

ACF2 software has been widely accepted in the user community because—quite simply—it offers important advantages over other packages. Among its major strengths are these:

- *Protection by default.* With ACF2 software *all* data is automatically protected.
- *Phased implementation.* ACF2 software lets *you* decide which resources to bring under security control. And when to phase them in.
- *Low security administrative overhead.* ACF2 software enables you to define and implement your own security philosophy, based on rules you choose. Once implemented, there's no maintenance on those rules unless you change your philosophy.
- *No mods to the operating system.* With ACF2/MVS software, you don't have to modify the operating system, or reinstall it after IBM maintenance.
- *Ease of use.* ACF2 software is the easiest full-scope security system to administer—both centrally, and in a decentralized mode.
- *Global security.* Only ACF2 software provides integrated and consistent protection across all major IBM operating systems including MVS, MVS/XA, VS1, VM and VSE.

ACF2 software helps solve today's security problems *today.* And positions you to meet future security needs in the evolving IBM operating system environment.

For additional information on ACF2 software, contact Shawn McLaren today, at 1333 Lawrence Expressway, Santa Clara, CA 95051-3595; (415) 941-4558; Telex 357437.

ACF2 is developed by SKK, Inc., Rosemont, Illinois.
ACF2 is a registered trademark of SKK, Inc.

*Data published by Computer Security Institute, 1985.

The Cambridge Systems Group

Over a decade of strategic software solutions.

ACF2® security software.
Your bridge to the future.

Now Available
For IMS/DC Users.

MANTIS® 1981

"Cincom application tool slashes development time."
Source: Computerworld, January 19, 1981

MANTIS 1982

"MANTIS has paid for itself many times over in programmer productivity and end-user satisfaction."
Source: Jay Lazarre, V.P. for MIS, Pellerin Milnor

MANTIS 1983

"Performs like COBOL, with the productivity of a true 4GL — and used for all new, on-line development."
Source: Tony Liberoni, Manager of Operations and Systems, PPG Industries Chemical Group

MANTIS 1984

"100% of our new on-line development is in MANTIS."
Source: Luther Perry, D.P. Director, Santa Cruz County, CA

MANTIS 1985

"MANTIS is the international on-line application development standard for General Foods."
Source: Fred Lambrou, International Director of Information Services, General Foods International

MANTIS 1986
The Best Just Got Better.

Proven in over 2,000 user sites, MANTIS, from Cincom,® is the premiere fourth generation application development system.

And, now the best is even better. Our major new release of MANTIS gives you even greater performance and productivity.

With MANTIS, you can prototype, refine, test, and release an application for production in a single, interactive session. Compile-free MANTIS applications are fast, and easy to develop and maintain. And MANTIS provides such high performance that many users make it their standard for all on-line applications.

MANTIS portability lets you move applications – **without change** – from one operating environment to another. From VSE to MVS. From CICS to IMS/DC. Even from one hardware system to another, including IBM,® DEC™ VAX,™ Wang VS,® NCR® VRX and others. And MANTIS provides support for multiple data structures, such as VSAM, DL/1, SQL/DS, SUPRA™ and others.

To see just how much better MANTIS really is, **compare it to any other system** you're using or evaluating. For a demonstration or more information, call the toll-free number below. In Ohio, call 513-661-6000. In Canada, 416-279-4220.

1-800-543-3010.

CINCOM®

World Headquarters • 2300 Montana Avenue • Cincinnati, Ohio 45211

IBM is a registered trademark of the International Business Machines Corporation.

DEC and VAX are trademarks of Digital Equipment Corporation.

Wang VS is a registered trademark of Wang Laboratories, Inc.

NCR is a registered trademark of NCR Corporation.

Notes: Call IBM toll free

From page 40

velopment tools for Model 204 applications and will introduce a personal computer version of Accolade compatible with the mainframe version. The PC version is expected to be released sometime this summer.

■

IBM has established a toll-free number for software and service companies that want to comarket a product or pursue some other joint agreement. The number is **1-800-IBM-VARS**.

■

New data retrieval software will be released in November by **Pansophic Systems, Inc.**, for use in information centers. Called **Query**, the internally developed software will use English language commands to enable those not familiar with programming commands to extract data from data bases.

■

VM Software, Inc. next year will release utility software to provide for operatorless backup, monitoring and batch operations of IBM's SQL/DS.

■

Applied Data Research, Inc. (ADR) and **Ashton-Tate** have agreed to provide for **direct information exchange** between ADR's Datacom/DB mainframe data base management system and Ashton-Tate's Dbase and Framework micro products. ADR will adapt its ADR/PC Datacom and personal computer-based query and report-writing facility to allow the information exchange capability.

TURN YOUR IBM 3160 DISPLAY INTO TWELVE 3277s

Unlock the 3270 potential of your **IBM 3161, 3163** or **3164 ASCII Display** with **3160 Extended Support for the Series/1** When used with the IBM EDX Communications Facility (CF), 3160 XS enables a 3160 user to logon to up to twelve concurrent Host application sessions from a single display 3160 Extended Support includes the following features

- Provides 3277 emulation services for the IBM 3161, 3163 and 3164 ASCII Display Stations
- Supports from one to twelve concurrent Host applications on a single display
- Up to 20 displays and 60 viewports supported on a single Series/1
- Enables downline loading of alternate keyboards, including foreign language and scientific character sets, from the Series 1
- 3160 native keyboard functions, including PF1-24, PA1-3, CLEAR and Local Print
- Interfaces through the Series 1 Feature-Programmable (FPCA) and Multifunction (MFA) attachment cards
- All communications interfaces provided with CF are supported, including SNA, BSC and S/370 channel
- Easy to install and customize

Small Systems Communications Products — Specializing in products and services for the IBM Series 1 and Personal Computers

For more information, please call or write

Small Systems Communications Products
62 Lenox Road ■ Kensington, CA 94707 ■ 415 234-SSCP

Rabbit reveals agreements

From page 37

IBM, too, is moving to provide connectivity among its family of computing products. The recent agreement with Rabbit gives IBM the right to market Rabbit's 3270-Plus intelligent micro-to-mainframe link for the IBM Personal Computer AT. It will be marketed as a licensed program under the IBM logo as Interactive Executive 3270-Plus.

The deal with Burroughs, announced last week, will give Burroughs direct communication links and system compatibility with IBM's SNA mainframe and minicomputer networks.

The agreement calls for Rabbit to supply Burroughs with its 3270-Plus Binary Synchronous Communications and 3270-Plus SNA terminal emulation packages, which run under Burroughs' proprietary operating system, BTOS, and Unix, and with Rabbit's RJE-Plus software for remote batch processing. The five-year deal reportedly is worth more than $5 million.

The Rabbit software will provide intelligent distributed processing capabilities for programs running on BTOS. Burroughs will install the 3270-Plus terminal emulation software on its B25 family of microcomputers and its XE 500 distributed processing systems. The RJE package will be available on the XE 550 only.

The deal with Tolerant Systems, announced a week earlier, is Rabbit's first major sale of its Peer-to-Peer Plus software, which implements IBM's LU6.2/PU2.1 Advanced Program-to-Program Communication facilities, part of IBM's SNA.

Rabbit also will supply 3270-Plus, RJE-Plus and Spooler-Plus print management software for Tolerant's Eternity series of fault-tolerant on-line transaction processing systems. The five-year deal is reportedly worth more than $3 million.

"The nature of transaction processing is that it has to link into and fit in with the customer's existing technological base," said Shirley Henry, marketing director at Tolerant.

"Since commercial data processing is dominated by IBM, and SNA is the preferred methodology, Rabbit software allows us to act as a fault-tolerant, on-line, transaction processing node within an IBM network," she said.

SCI Systems will install Rabbit's 3270-Plus package on its SCI Series 1000 and Series 2000 intelligent workstations and microcomputers, giving SCI IBM-compatible micro-to-mainframe links to SNA.

Ada gets boost from SDI

From page 37

faster hardware without a massive rewrite of their existing programs.

The DOD funded Ada's development in the 1970s because it was concerned with software life cycle costs.

A second plus for Ada is that it is designed to provide millisecond response times, something that mainframe computer users, pampered by personal computers, are now demanding.

Ada is notable, too, in that the rules for its use, while they may be many, are clearly spelled out, a quality that gives Ada the potential to eventually incorporate artificial intelligence. Those many rules, after all, may be learned by an AI program that, for example, could convert English language statements into Ada code.

With qualities such as these to recommend it and with the SDI effort to promote it, Ada is poised to take a significant share of the market in commercial programming languages, according to Verdix's director of marketing, Jack Crosby.

"The Fortune 500 companies have the same needs as the DOD," Crosby says. "As Ada begins to pay off for the government, the Fortune 500 will make Ada their language of choice."

The number of deals being made lately by Ada vendors is an indication that things may be heating up in that market. Verdix has announced a $1 million licensing agreement with Pyramid Technology Corp. under which Pyramid will gain the right to develop versions of the Verdix Ada development system for use on Pyramid Technology superminis.

Late last year, software vendor CRI, Inc. announced two packages, a data base management system and project management system, that it said were the first Ada applications for commercial use.

With the DOD gearing up for a spending effort comparable to the Manhattan Project — a program that will spend $4.8 billion on SDI research in fiscal 1987 alone — Ada use is bound to spread to the commercial sector.

After all, the last time the Pentagon sponsored the development of a computer language and then standardized on it, that language — Cobol — became the standard in the commercial sector.

What is FAST™?

FAST Takes Interactive Application Design

FROM THIS . . . .

- LIMITED and INFLEXIBLE—having single agendas and single purposes.
- INCOMPLETE—covering only one pre-coding phase—never all.
- DOGMATIC—highly dependant on adherence to one methodology.

TO THIS!

- FLEXIBLE—with multiple agendas—a menu for different projects.
- COMPLETE—covering all activities from feasibility through complete external design.
- VERSATILE—fitting into any methodology.

FAST *is an interactive design technique developed by* **Gary Rush** *after many hours of leading design sessions and finding gaps in other techniques.* **FAST** *has been designed to overcome those deficiencies.* **FAST** *provides:*

- Multiple, flexible AGENDAS for different projects and methodologies.
- STAGES of delivery for planning and structuring workshops.
- Defined ROLES for workshop participants.
- Iterative PHASES and TOOLS fitting any methodology.
- Unique VISUAL AIDS.
- TRAINING to provide skills, tools, understanding and EXPERIENCE.

The **FAST** Session Leader Workshop is a unique integration of behavioral science approaches to group facilitation and state-of-the-art interactive design.

The next workshop is
May 18-23, 1986

For more information and registration, please call or write:

Facilitated
Application
Specification
Technique

MG RUSH SYSTEMS, INC.
P.O. Box 848
Newton, NJ 07860
(201) 383-2759

Copyright 1986, MG Rush Systems, Inc.
FAST is a trademark of MG Rush Systems, Inc.

"Productivity is a way of business, not a collection of tools."

SYSTEMS & PERIPHERALS

HARD TALK
James Connolly

Fault-tolerant mart matures

Once viewed as little more than an add-on peripheral — a front-end processor that made an IBM mainframe's job just a little easier — the transaction processor appears to be growing into maturity, establishing its own role in corporate computing.

Events are breaking rapidly in the transaction processing and fault-tolerant markets, and at least two traditional mainframe vendors appear to be paying heed. What vendors like IBM and NCR Corp. — as well as fault-tolerant systems manufacturers such as Tandem Computers, Inc. — seem to have noticed is that users are finding more ways to use fault-tolerant transaction processors. The market has surged beyond management of automated teller machine networks.

Among the more noteworthy recent occurences have been the following: Tandem's introduction of a new high-end system, its Nonstop VLX, which is designed to process several hundred transactions per second; NCR's commitment to transaction processing and fault-tolerant architecture in its 9800 series of systems; and IBM's positioning of its System/88 — built by Tandem's young competitor Stratus Computer, Inc. — as a host for banking and other financial terminals under IBM's Systems Network Architecture.

The on-line transaction processing market has grown steadily during the past decade, but the mart now seems positioned to soar by at least 15% per year. In conjunction with their recent announcements, Tandem and

See **FAULT-TOLERANT** page 44

Connolly is Computerworld's *senior editor, systems & peripherals.*

DG superminis make noise in business; Hutton listens

By Donna Raimondi

NEW YORK — The E. F. Hutton & Co. financial services firm has taken delivery of one of the first Data General Corp. MV/20000 superminicomputer systems. Both the MV/20000 and its little sister, the MV/2000DC, have started to find their way into the marketplace.

At E. F. Hutton, both systems — announced by DG in November 1985 — eventually will be added to a large number of MV/10000, MV/8000 and MV/4000 machines used for a branch information system in 400 offices around the world.

"We have a networked system tied together with a private telecom network," says Bernard A. Weinstein, vice-president responsible for communications, programming and systems.

The MV/20000, currently being tested in one of the main New York corporate data processing centers, will be joined by a number of other MV/20000s during the next year. "We are using multiple MV/10000s in some regional centers, where one MV/20000 will do," Weinstein says.

The MV/10000s will be handed down to sites where MV/8000s are straining to keep up. In turn, the 8000s will pass down to current 4000 sites, and the MV/4000s — along with some new MV/2000DCs — will go into small satellite offices or new offices.

Both of the newest DG machines have also been received by McDonnell Douglas Corp.'s Manufacturing Industry Systems Co., says Richard Rothfuss, director of marketing communications. The systems will be bundled with McDonnell Douglas Manufacturing's mechanical computer-aided design and manufacturing system, Unigraphics II, and resold. "The changes to port the software onto these new systems were negligible — we did it overnight," Rothfuss says.

Weinstein is putting the new system through its paces and likes what he finds. "We are running our normal applications on it, and it hums. We have not quantified it through performance parameters, but it is amazing how fast it goes," he says.

E. F. Hutton will not need something as big as the MV/20000 in any of its

See **DG** page 48

Upgrade board revs up IDM 500

Enhancements earn 38% average throughput gain

By Charles Babcock

LOS GATOS, Calif. — Britton Lee, Inc., manufacturer of hardware-based relational data base management systems, last week announced a processor board that speeds up the performance of its IDM 500 series.

Company President David L. Britton said an average of internal benchmarks indicated the new board "executes instructions up to 60% faster than our standard data base processor board."

The faster execution speed, combined with other enhancements, results in an average throughput gain of 38%, Britton said. The enhancements include the addition of cache memory, more random-access memory (RAM) and an upgraded disk channel.

"In other words, the same number of concurrent users can experience a 38% increase in performance, or you can achieve the same performance levels and add 38% more users to the network," said Britton.

The processor board and other enhancements are available for $25,000 to $35,000, depending on system configuration.

Also available as a standard feature on the IDM 500 is a mirrored disk system, which duplicates critical data bases on a redundant set of drives. The mirrored disk

See **UPGRADE** page 48

INSIDE

Honeywell adds a model and cuts prices of other systems in its DPS 7 lineup/**44**

Memorex introduces a disk cache unit and an IBM-compatible terminal/**45**

NEW THIS WEEK

- Hewlett-Packard adds memory cache to the controller of its 404M-byte drives
- For more on this and other new products, see pp. 81-104.

INSTANT ANALYSIS

"Judging from the public statements of some other executives in our industry, our very substantial gains in orders were not characteristic of the industry as a whole and therefore may not be sustained."

— NCR Corp. Chairman and President Charles E. Exley Jr.

NAS ships double-density 3380-class plug compatibles

Beats other vendors to disk system punch

By Jeffry Beeler

MOUNTAIN VIEW, Calif. — A New York-based investment banking firm recently became one of the first customers to receive plug-compatible equivalents of IBM's double-density, 3380-class disk systems.

Part of the shipment of National Advanced Systems Corp. (NAS) Model 7380-AE and -BE storage units went to Morgan Stanley, Inc., where the machines are currently being tested for reliability. Morgan Stanley officials said the drives have passed their tests thus far and that the testing is continuing.

Other disks were delivered to five user organizations representing federal and state governments, the manufacturing sector and the pharmaceuticals industry, according to Ken Page, NAS' director of peripherals marketing. NAS declined to identify specifically the 7380-AE and -BE recipients except for Morgan Stanley.

Thus far, Page said, the vendor has delivered about 40 of the units, which correspond to IBM's dual-density 3380-AE4 and -BE4.

NAS is not the industry's first supplier of double-capacity, 3380-class disk subsystems. That distinction belongs to IBM, which started shipping its AE4s and BE4s last August. But NAS does appear to be the first double-capacity disk system supplier among the plug-compatible vendors. None of the other plug-compatible manufacturers — including Amdahl Corp., Memorex Corp. and Storage Technology Corp. — is expected to deliver similar products for another three to 12 months.

NAS also succeeded in shipping its dual-density storage modules on time. When the 7380-AE and -BE were announced back in March 1985, the company promised to make the products commercially available by the end of the second quarter of this year. On April 11, the first of NAS' double-capacity disk units were delivered to Morgan Stanley, Page said.

Since then, the investment banking firm has been testing the machines extensively off-line. "We've been driving the products pretty hard, thus far without a failure," said Morgan Stanley partner Earl Kidd, who heads the firm's technical services activities. "We've put them through a couple of million I/Os a day and have wrapped them in plastic curtains to see how they would perform under high temperatures."

Kidd declined to speculate about how long the tests at Morgan Stanley would continue.

Unlike IBM's double-density 3380s, which incorporate thin-film technology, the 7380-AE and -BE use a ferrite head design that NAS claims gives them better reliability and a 27% lower cost per megabyte than their Big Blue counterparts. These claims played a key role in Morgan Stanley's decision to buy its latest external storage units from NAS rather than IBM, Kidd said.

Fault-tolerant mart matures

From page 43

NCR cited a variety of market research firms' forecasts. NCR cited the Gartner Group, Inc.'s prediction that the worldwide on-line transaction processing market will grow from $34 billion in 1986 to $53 billion in 1989. Tandem quoted Frost and Sullivan, Inc. as predicting a jump in sales from the $15.8 billion level of 1984 to $47.7 billion in 1990 and cited Dataquest, Inc. numbers showing the market as being $13 billion today but growing to $36 billion in 1990.

Tandem also quoted Frost and Sullivan as saying that while on-line transaction processing applications took up 50% of mainframe expenditures in 1984, they will use 75% of those funds in 1990. That seems to signal a shift in the market, not only with the addition of new applications but with the migration of existing applications into the on-line transaction processing environment.

Another market research group, International Data Corp. (IDC), Framingham, Mass., in conducting its annual migration study, asked DP managers about the criticality of features in system selection. More than 80% of the respondents cited 99.9% uptime as being crucial, which made it the most demanded feature, while transaction processing finished third. IDC also attributed the high demand for data base management and multiprocessing to their association with transaction processing and high availability.

On-line transaction processing has gone beyond the automated teller machine and electronic funds transfer stage. Some markets being cited by the vendors are still in that financial arena — point-of-sale support, bank branch automation support, home banking, credit authorization and securities trading.

But other applications being targeted include retail and warehouse inventory management, order processing, manufacturing shop floor, material resource planning, reservation systems and videotext.

However, a familiar ghost arose during the NCR and Tandem announcements, the haunting performance measurement question. Tandem, which long has complained about the use of millions of instructions per second (MIPS) to measure performance of transaction systems, reportedly relied on the debit and credit benchmark to establish a 40 transaction/sec. minimum rating for its basic VLX and cited an average response time of 1.5 sec.

NCR quoted a figure of 52 transaction/sec. for its current high-end 9884 model, but the company confused matters by tossing around statistics such as "4 batch MIPS" and "8 transaction MIPS." NCR also drew comparisons between its 9800 family and IBM's high-end 3090 mainframe line, a comparison that can be justified only by NCR's caveat that they were discussing transaction capabilities and not overall power.

So the on-line transaction processing market is there, and the vendors appear to be ready to address it. But the question remains whether the buyer will be able to judge one system against another.

Honeywell extends DPS 7 line, cuts prices

Entry-level mainframe user market targeted

By James Connolly

PHOENIX — Setting its sights on the entry-level mainframe user and the IBM System/38 market, Honeywell, Inc. has introduced a new model and cut prices for its DPS 7 line of medium-scale systems.

The new model is the DPS 7/40E, which the company claims will provide 25% more performance power and twice the memory at about the same cost of the previous entry-level DPS 7/35E. The DPS 7/40E replaces both the DPS 7/35E and the second-tier model DPS 7/45E. The remaining DPS 7 models, the DPS 7/55E and DPS 7/65E, received 25% price cuts.

The DPS 7/40E costs $89,000 or can be rented for $3,177 per month on a five-year lease and is available immediately. The price for the DPS 7/55E was cut from $158,800 to $120,000. The DPS 7/65E was reduced from $215,700 to $160,000. In addition, the prices of upgrades within the DPS 7 line have been cut by an average of 42%, and the price for additional 2M-byte memory modules was cut by $5,000 to $15,000.

Andre Kasberger, marketing director for the DPS 7 line, said the DPS 7/40E is targeted at new business as well as providing an upgrade path for current Honeywell Level 62 and Level 64 users. "The price and performance levels of the DPS 7/40E make it attractive in high-uptime environments, end-user solution centers and DPS 7 shops requiring the added power of a second system," Kasberger said.

Honeywell also announced its MSP4370 mass storage processor and MSU1007 for the DPS 7 line. Each MSP4370 can handle 8G bytes of data, with 1G byte stored on each MSU1007. The fixed-media subsystems operate at 1.8G byte/sec.

The subsystems will be available in the third quarter of this year at a cost of $27,000 for the MSP4370 and $34,275 for the MSU1007.

Now
a laser printer
with a price that's
fit to print.

Memorex storage unit boasts greater control over cache

IBM 3270-compatible compact color display station also unveiled

By James Connolly

SANTA CLARA, Calif. — Claiming that it can provide the user with greater control over what information should be staged in cache, Memorex Corp. has announced a disk cache storage control unit for its 3680 and 6240 High Density Package (HDP) disk drives.

A Memorex spokesman said the 3888-23 cache unit lets the user select what information should be staged in cache, thus avoiding the waste in time created when other cache subsystems load cache with unnecessary records that are never referenced.

'Access time has not kept pace'

"The power of mainframe computers has increased, but the access time to on-line data sets has not kept pace. Inherent mechanical motion and rotational delays of disk drives have inhibited the increase in performance. Disk cache solves this problem," noted Memorex Vice-President for Marketing Bill Etheredge.

The 3888-23 is said to be a plug-compatible replacement for IBM's 3380 Model 23 controller and to provide an independent processor for cache management.

The Memorex unit offers from 8M to 64M bytes of cache storage using 256K-bit dynamic random-access memories. Memorex officials said that if any portion of memory fails, the 3888-23 can automatically bypass unusable memory in 48K-byte sections, allowing the cache to remain functional.

Will attach to future 3680-family drives

The 3888-23 attaches to the 3680 and 6240 HDP drives and will attach to future 3680-family drives. The 3888-23 will also attach to the double-capacity drives that the company said it will introduce later this year. According to the company, the cache unit operates with the IBM 3090, 3080, 3030 and 4381 and with compatible mainframes.

An 8M-byte 3888-23 costs $129,400. Production shipments are scheduled for the fourth quarter of this year.

Color display station

Memorex also announced a compact, color display station for the IBM 3270 environment.

The 14-in. 2179 Display Station reportedly can display two, four or seven colors and was designed as a plug-compatible replacement for the IBM 3179 or IBM 3279 terminals.

Its modular design includes a logic module that snaps on the back of the monitor for easier maintenance and installation of enhancements. Its features include the ability to set the display's brightness, contrast, cursor and other screen functions through the keyboard.

Other features are said to include a record and playback ability for frequently used character strings, light pen support, extended highlighting and reverse video.

The 2179 costs $2,095.

MAI/Basic Four adds two series to MPX systems

By Rosemary Hamilton

TUSTIN, Calif. — MAI/Basic Four has added two high-end series to its MPX line of multiuser business systems. The systems began shipping this month.

The MPX Series 9000 and MPX Series 9500 run under the firm's Boss/VS operating system and are based on the company's proprietary CPU.

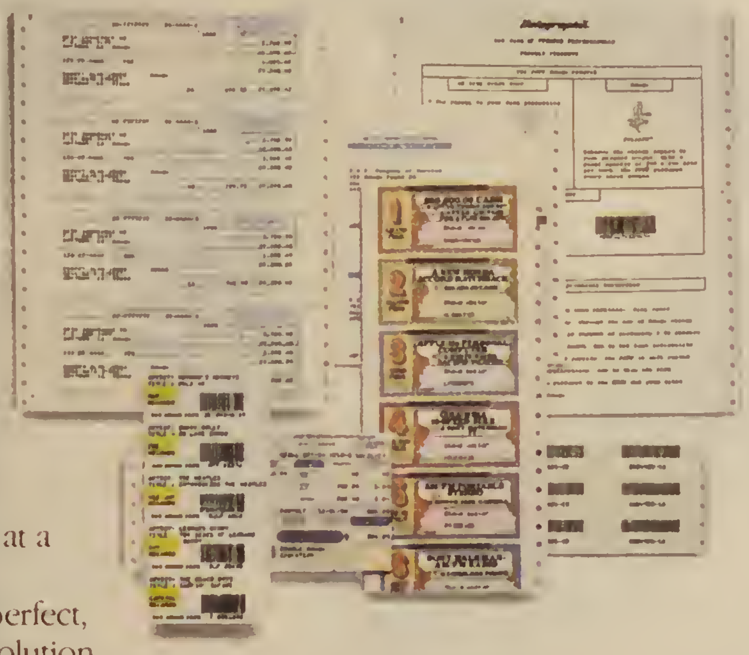
The Series 9000 is made up of two models, the 9010, which is based on one CPU, and the 9020, based on two processors.

Similarly, the Series 9500 is made up of three models that are differentiated by the number of processors. The low-end 9500 has one processor, and the high-end 9530 has three processors.

The Series 9000 supports up to 116 users and has a starting price of $135,000. The models come with 4M bytes of main memory, expandable to 12M bytes; 300M bytes of disk storage, expandable to 3.7G bytes; a 200 line/min printer; and one terminal.

The Series 9500 can physically support up to 255 terminals, but a more typical configuration would be 164 users. The models come with the same minimum main memory and disk storage configuration as the 9000 models. However, the 9500 models can support 5G bytes of disk storage. A typical configuration with 6M bytes of main memory; 1G byte of disk storage; two printers; five controllers, which can each support up to 16 disk drives; and 75 terminals would sell for $342,000.

Upgrades from the company's Series 7000 and 8000 to the 9000 typically involve a CPU and controller swap and cost $65,000.



The DatagraphiX 6800.
Best price/performance*
$179,000 can buy.

The 6800 is only about half the price of other high-production laser printers.

Yet, the 6800 is a full-function laser printer that fits in the space of one high-performance line printer.

Five times faster than line printers.

At 103 pages per minute, the 6800 outperforms five 2,000-line-per-minute line printers.

That's because it prints a page at a time instead of a line at a time.

And it prints each page letter-perfect, with 240 x 240 dot letter-quality resolution.

More versatile than other laser printers.

The 6800 is no ordinary laser printer. Laser generated data and text can be merged with optically projected forms of virtually any configuration within a wide range of page sizes. And, a new electronic forms option allows you to pre-program and dynamically merge electronic forms with print data, eliminating the need for many costly pre-printed forms. Its unique cold fusing process gives you the flexibility to print on a wide range of stocks and forms… window envelopes, even heat-sensitive, adhesive-coated forms…stocks you wouldn't think of loading into an ordinary laser printer.

Strong, silent.

The 6800 is built rugged but, unlike an impact printer, it's very quiet and very neat.

What's more, it's backed by the leader in computer output management systems, DatagraphiX, with strong service and support worldwide.

So call or write us today for actual print samples, brochure and complete specifications. DatagraphiX, Department 5C-3515, P.O. Box 82449, San Diego, CA 92138.

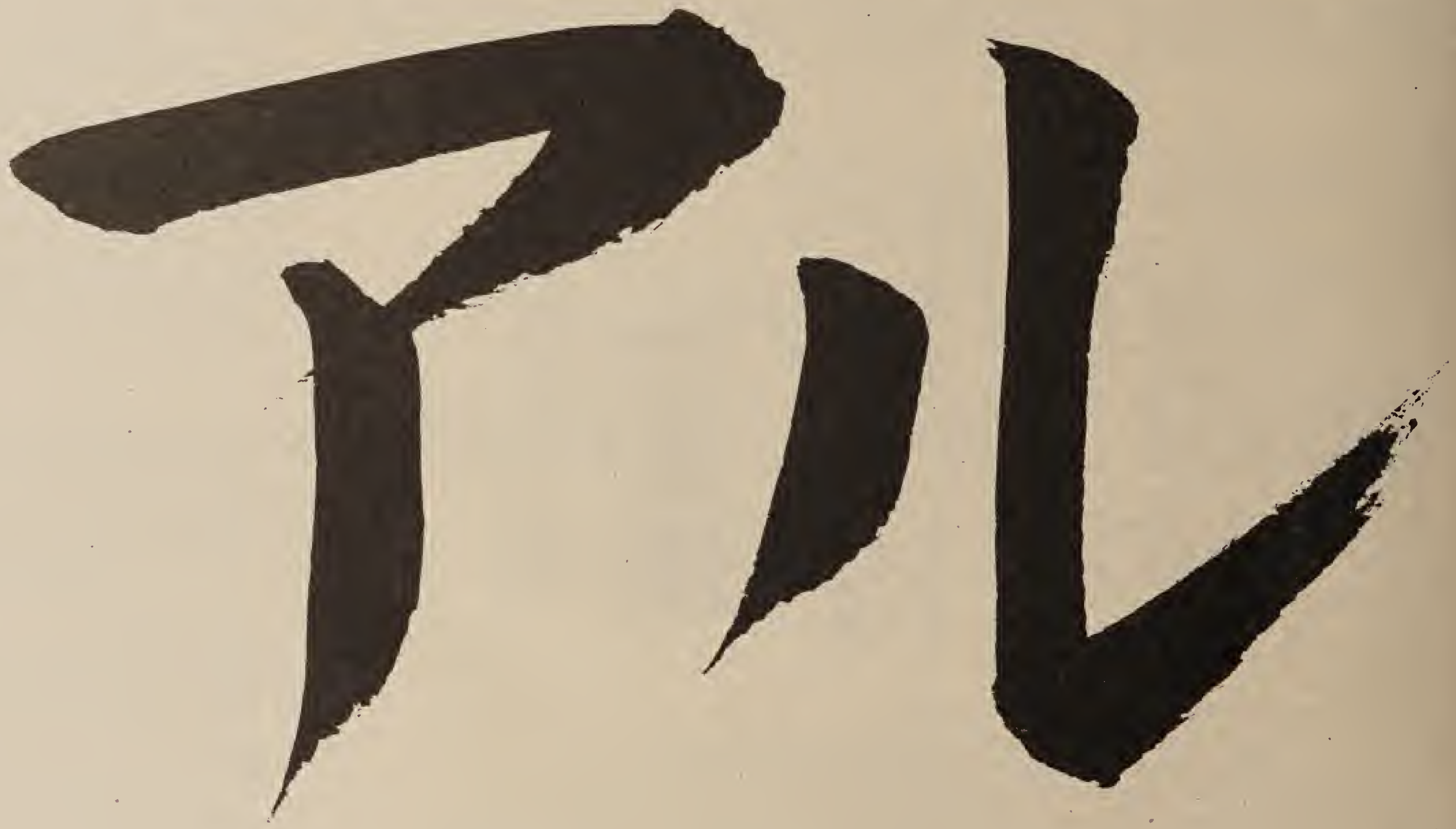
Phone toll-free (800) 457-7171. In California, call (619) 291-9960, Ext. 5626. TWX: 910-335-2058.

DatagraphiX®
The Computer Output Management Company℠
a General Dynamics subsidiary.

See us at AIIM, Booth 1129

See us at ABA/NOAC, Booths 1018-1024

HERE'S THE BIGGEST REASON TO DUMP YOUR OLD PRINTER.



That's pronounced "Alps."

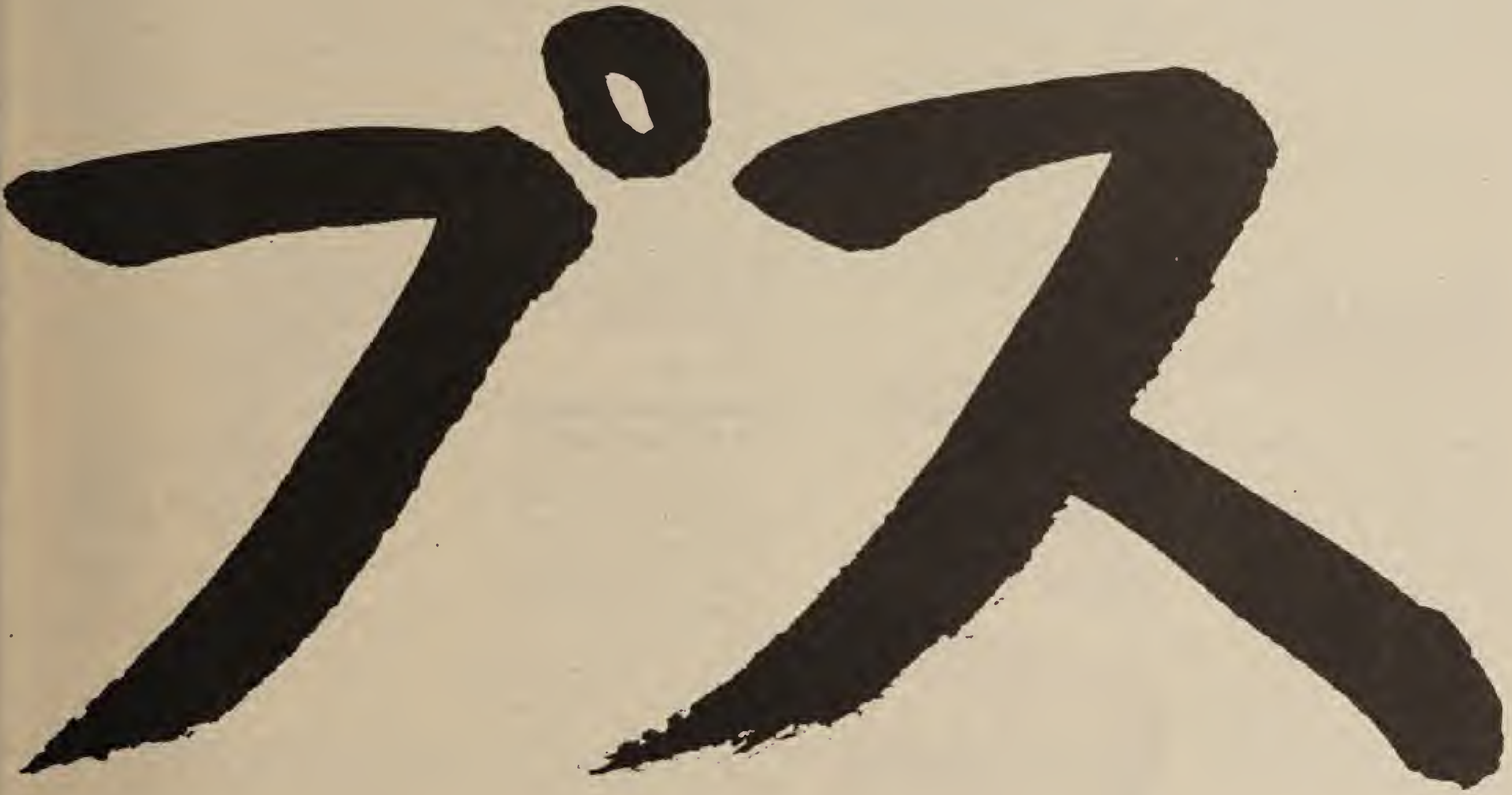
As in Alps Electric Co., Ltd., the Japanese company that manufactures the new Alps P2000™ Dot Matrix Printer. Which happens to be the perfect PC printer for companies who've outgrown their old ones.

Fine. But who's Alps Electric? And what difference does it make?

Alps Electric is an International Fortune 500 company. A $1.5 billion manufacturer of computer and electronic products.

A company that has been making computer printers for a decade and selling them in countries throughout the world. Including this country (under the brand names of major computer manufacturers).

P2000 is a trademark of Alps Electric Co., Ltd. © 1985 Alps America.



What's more, Alps Electric is the parent company of Alps America, the company that sells, services and supports Alps printers in America.

And the difference all that makes is this.

Whether you're buying one printer or a thousand, you really ought to buy them from a solid, experienced company you can depend on.

Which is exactly what we are.

Alps. Now that you know how to say it, perhaps you'd like to dial it. **(800) 828-ALPS.** In California, call (800) 257-7872.

We'll give you all the reasons the Alps P2000 should be your next PC printer. And we'll give you a brochure about it.

One written in plain English.

ALPS
AMERICA

NBI supplements 500 series

Unix-based NBI 570 supports more users

By James Connolly

BOULDER, Colo. — NBI, Inc. has added another member to its 500 series family of Unix-based computers, the NBI 570, which was designed to support more users while handling larger files.

The NBI 570, based on a 16.7-MHz Motorola, Inc. 68020 microprocessor, reportedly supports four times as many users as does the NBI 510. For example, the company said it would support 100 timekeepers while providing data base and text search functionality in a typical large law firm.

NBI officials said the NBI 570 supplements NBI's Oasys cluster controllers and the company's Integrated Workstation electronic publishing system.

The NBI 570 supports from 269M to 1G bytes of disk storage and from 2M to 14M bytes of main memory. The NBI 570 will begin shipments in August with a base price of $46,990.

The company also announced its BRS/Search Full-Text Keyword Search System, an information storage and retrieval system designed for text. Also due for August shipment, it runs on the 500 series and is priced from $18,000.

DG units make noise in business

From page 43

branches, only in the regional data centers, Weinstein says. DG systems with the company's Comprehensive Electronic Office (CEO) have been installed since E. F. Hutton picked that vendor two years ago to give employees a worldwide office automation system.

"I am not an engineer, but I do know that the 20000 uses emitter-coupled logic technology, and that makes for a lot of efficiency in price/performance, which I do understand," Weinstein says. The MV/20000 has three boards, as opposed to 11 boards on the MV/10000 version that E. F. Hutton already had, so it should be more reliable, he adds. "And the operating system has been expanded to allow up to 275 CEO users, so that really raises the ceiling." In terms of size, the MV/20000 seems to be about the same size as the MV/10000 while offering twice the power for half of the cost, according to Weinstein.

All of these factors are important, Weinstein says, because E. F. Hutton has a very ambitious office automation program in progress. It is hooking together 12,000 users, or two-thirds of its employees, on-line. All use will be interactive during the daytime hours, and all systems will be integrated on the same network. In addition to OA requirements, the system provides information management such as data bases and models, support for personal computing and communications functions.

One feature Weinstein is still waiting for is DG's announced AOS/DVS operating system, which would enable interconnection of various processors in a global system. The AOS/DVS, an addition to DG's 5-year-old AOS/VS, will allow transparent access of information on different processors across an entire network, says DG spokesman Greg Jarboe. The operating system is in beta test sites now and should be released generally in early June, he says.

Upgrade board revs up IDM 500

From page 43

system was previously an option on the 500 series, Britton Lee spokesmen said.

The high-end relational machine, the IDM 500XL, has been equipped with a new SMD/E disk controller that supports transfer rates as high as 3M byte/sec., more than double the current SMD controller's current 1.2M byte/sec. rate, spokesmen said. The price of the 500XL is $139,950.

Britton Lee is offering an addition to its high-end line, the 500XLE, which includes the SMD/E disk controllers, a high-speed tape controller and Britton Lee's previously announced data base accelerator. Together, this 500XLE configuration offers a 40% improvement in average performance over the 500XL. The 500XLE comes with 2.06G bytes of mirrored disk, four 515M-byte Winchester disk drives, a 340M-byte cartridge tape drive for file archiving and 4M bytes of RAM. It sells for $199,950, company spokesmen said.

The 500XLE can be equipped with a maximum of 6M bytes of RAM, the same limit that has been in effect on the earlier models.

The 500 series machines come equipped with expansion slots that allow a user to configure them with RS-232, IEEE 488, IBM block multiplexer or Ethernet local-area network interfaces. They are designed to operate simultaneously with computers from different manufacturers, and Britton said 600 have been installed.

The repackaged low end of the line, the 500X, is equipped with 680M bytes of mirrored disk, 2M bytes of RAM, a 340M-byte cartridge tape drive for data backup and a tape controller.

ON-LINE SOFTWARE ADVANCED TRAINING

1
CICS 1.6 TO CICS 1.7: THE DIFFERENCES BETWEEN TWO RELEASES
2 DAYS/$600

Ease Your 1.7 Conversion

This two-day course includes information that's not even in IBM®'s Release Guide, because we studied Release 1.7 in depth before developing the curriculum. Aimed at systems programmers responsible for installing and supporting the new release as well as application designers, the course covers the entire spectrum of 1.7 changes, from application programming interfaces through the internal components of key management structure.

July 8-9 Fort Lee (NY area)
July 22-23 Chicago, IL
September 11-12 Fort Lee (NY area)

2
CICS/VS CONCEPTS
1 DAY/$250

Concise CICS Introduction

In just one day, system and application programmers, and analysts new to CICS, as well as managers and users, can gain an understanding of CICS concepts and facilities. The course explains the differences between on-line and batch operations and discusses the components of CICS with emphasis on design and coding considerations.

July 25 Fort Lee (NY area)
August 15 Los Angeles, CA
September 12 Chicago, IL
September 26 Los Angeles, CA

4 NEW COURSES FROM ON-LINE SOFTWARE

CALL TOLL-FREE 800 526-0272
IN NEW JERSEY CALL 201-592-0009

On-Line Software International, Inc.
IBM® Software Authorities

3
IDMS APPLICATION PROGRAMMING
4 DAYS/$900

Concepts and Coding in One Intensive Course

This concentrated four-day class for application programmers provides in-depth coverage of IDMS concepts, as well as effective coding techniques for batch and CICS application programs accessing IDMS data bases.

July 7-10 Fort Lee (NY area)
August 11-14 Fort Lee (NY area)
September 8-11 Washington, DC

4
MICRO COMPUTERS FOR THE EXECUTIVE
2 DAYS/$600

Unlock Your PC Power

Managers who need to know what personal computers can do for them should attend this new three-day class. They'll learn to analyze and report on business data using Lotus® 1-2-3,™ dBASE III,™ and the Chart-Master® graphics package.

July 28-30 Fort Lee (NY area)
September 2-4 Fort Lee (NY area)

IBM is a registered trademark of International Business Machines.
Chart-Master is a registered trademark of DecisionResources.
dBASE III is a registered trademark of Ashton-Tate.
Lotus 1-2-3 is a registered trademark of Lotus Development Corp.

For information on all our classes, call toll-free (800) 526-0272. In New Jersey and Canada, call (201) 592-0009.

NEW YORK NEW JERSEY ATLANTA BOSTON CHICAGO DALLAS DENVER
DETROIT LOS ANGELES HOUSTON SAN FRANCISCO WASHINGTON, DC

Executive Report

Edited by Janet Fiderio and Becky Batcha

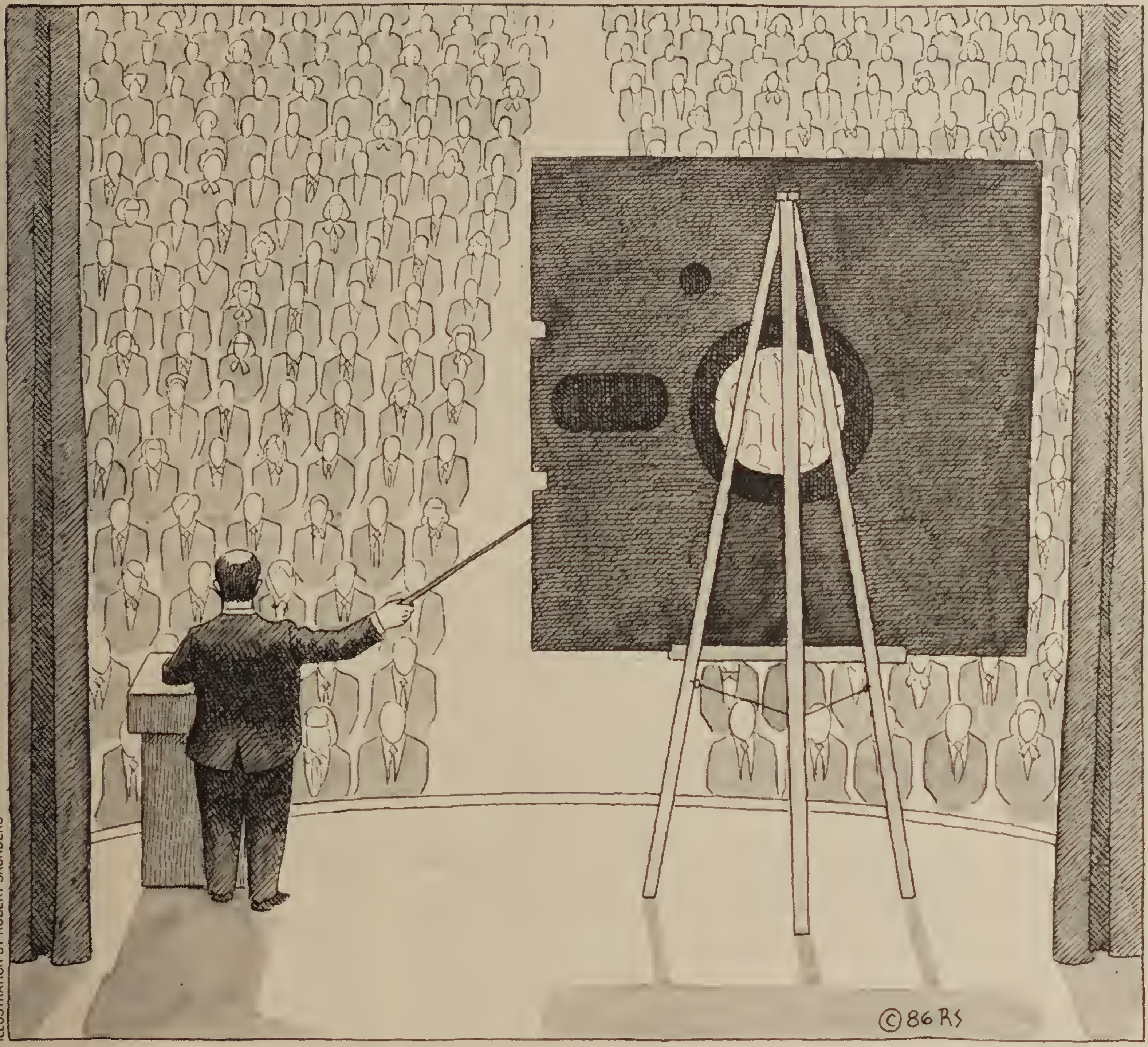


ILLUSTRATION BY ROBERT SAUNDERS

INSIDE

Why corporate trainers should participate in strategic planning/50

How to satisfy the executive's special instruction needs/55

Computer-based training: When to buy, when to build/58

Interactive designs, humor, game techniques — elements of interesting CBT/60

Managing end-user training

Dedicated staff, proper tools solve instruction snags

By SHARON EFROYMSON

Training end users is a pursuit without much precedent in data processing, in that it trys to bring technical information to nontechnical people. Given the job's novelty, it comes as no surprise that most companies' training programs are currently in a phase of experimentation and change.

At this early stage of the game, every manager who is responsible for an end-user training program faces a slew of problems, each bearing on the eventual success of the program:

- Training managers need to promote their programs so as to attract potential students.
- They need to decide what types of training are most effective: classes led by instructors or those guided by computer-based training (CBT) or interactive video programs.
- They have to figure out where training should take place and how outside vendors might aid the company's program.
- As their company's program matures, these managers need to follow up on early endeavors, measure the success of various courses and export successful programs to additional corporate sites.

Of course, before individual training managers can make any decisions, companies need to decide who should manage end-user training. Top management should make sure responsibility falls on a group of people dedicated entirely to training. Dedicated trainers manage better than part-time workers in keeping courses and manuals up to date and in developing new courses that meet end users' demands.

In some cases, training becomes the responsibility of a few workers in the information center — the hub of end-user services in many corporations. When training, applications development and end-user support all take place under the same roof, the quality of training stands to gain. Consultants who work in the information center can tell trainers about quirks they discover in new releases of software packages, for example, and the trainers can pass the word on to users.

> *When training, applications development and end-user support all take place under the same roof, the quality of training stands to gain.*

Often, however, information centers are understaffed and overloaded. Staff members cannot dedicate themselves entirely to training because they feel swamped with other responsibilities.

Fidelity Investments, a financial services

Efroymson teaches personal computer communications to corporate clients at the Center for Advanced Data Processing, Inc. in New York.

Staff, tools solve instruction snags

Continued from previous page

company in Boston, faced this problem and found a solution. Fidelity maintains more than 650 microcomputers and runs 10 internal training courses every week. Topics for the courses range from an introduction to Lotus Development Corp.'s 1-2-3 to a hands-on workshop on how to use a Cobol generator.

At first, Fidelity's information center handled all training needs, but the load became too great, according to Jim Stoudard, the firm's information center manager. "My consultants needed time to work on applications with the end user," Stoudard says, "and they didn't have the time to spend on course development."

Fidelity solved the problem by dividing responsibilities between the information center and a dedicated training department. The information center took charge of all advanced courses, such as advanced macros and most data base topics, and the training group took over more basic classes.

One condition of the split was that responsibility for classes would change hands as users' sophistication increased. Whenever an advanced class became standard fare, responsibility for that class would pass over to the training department. Since the plan's inception, some fairly sophisticated classes, including an introduction to Microrim, Inc.'s R:Base, have moved under the department's jurisdiction.

Responsibility for training need not rest in an information center or a training department. Data processing and human resource departments often train users. When training comes out of MIS, however, users sometimes complain that their instructors are too technical; when it comes from the human resource department, they find that course material is not technical enough.

Because of the uncertainty about end-user training's rightful place, turf battles break out often. A financial institution that prefers to remain unnamed provides a case in point. The institution's training department has operated for a few years, yet it continues to report to both human resources and MIS. Beyond presenting political difficulties, the setup slows the training department's growth and limits its effectiveness.

Companies that want to avoid a similar snag should attempt to position their training programs under one department from the very start. If human resources and MIS both assume responsibility, neither department will abandon power without a struggle.

THE TRAINING MANAGER'S TOP FIVE CONCERNS

MITCHELL J. HAYES

Promoting the program. Attracting users to a training program can prove difficult, especially in a large, decentralized company. Mass mailings help spread the word, as do announcements in corporate newsletters.

Choosing among methods. Self-study alternatives like computer-based training (CBT) and audiovisual presentations save a company the costs of developing its own training program and allow users to pace themselves. But most users prefer the personal touch of an instructor.

Exporting training. Whereas instructor-led training makes sense at corporate headquarters, it is often too costly to duplicate in branch offices. To keep costs reasonable and ensure uniformity, many companies export training via video, CBT and other automated means.

Deciding who will train users. Trainers from the MIS department are sometimes too technical, while trainers from the human resource department are not technical enough. Information center staffs are often too busy to help. Outside training vendors can handle a company's overflow.

Measuring success. Mature training programs need to demonstrate results. Student evaluation forms and qualification tests provide two effective means for gauging a program's effectiveness.

CW Chart

After a company places responsibility for training on a particular manager's shoulders, one of that person's first objectives is to entice users to register for classes. Getting the word out about new in-house training programs takes some effort, especially in a large, decentralized corporation.

At CBS Magazines, the consumer publishing division of CBS in New York, trainers generated publicity by mailing course announcements to just over 1,000 people at three locations. "We sent out a mass mailing to our entire company," says Louis Lisko, director of end-user computing for the division.

The announcement listed courses and requirements. Any user could attend, so long as he obtained his manager's approval and had a personal computer on which to practice what he would learn. As a follow-up to the mailing, Lisko placed a notice in CBS' company newsletter.

Lisko's efforts proved successful in piquing end users' interest. Of the 450 to 500 computer users at CBS Magazines, more than 100 signed on for some type of course.

In addition, the mailing provided a means of screening users before assigning them to a class. With each course announcement, Lisko's department enclosed a questionnaire that asked users to gauge their computer literacy and list their department name and other administrative information.

From users' answers, trainers could judge whether there were enough individuals in the same department or at the same literacy level to merit creating a separate class.

Lisko turned to the mass mailing and the newsletter announcement to generate interest when CBS' training program was only a few months old. Established training programs rarely require so much publicity; users tend to know computer courses exist.

In just about every company where training is voluntary, however, a block of users refuses to enroll. Ignorant users can burden an information center with their support needs, according to Fidelity Investment's Stoudard, so training managers should do all they can to keep this block as small as possible.

"The guy who says, 'I'm not going to go to class,' is the guy who calls us and says, 'I can't get my printer to work,' " Stoudard explains. He offers a handy solution for dealing with these bothersome users: "Refuse to help them until they go through class."

The training manager must also decide among competing forms of instruction. Most trainers feel that courses led by human instructors are more effective than any other type, but self-study methods like computer-based training and audiovisual presentations offer sound alternatives in specific situations.

April Allridge, a senior systems analyst at Manufacturers Hanover Trust Co. in New York, is a strong advocate of instructor-led training. When her company offered a CBT course in a fourth-generation language, people shied away, she says. "Many people have computer phobia."

Allridge currently leads a course in computer basics where five to 10 students at a time can get the initial hand-holding they need. She uses CBT materials as a supplement. "You have to start with a personal approach, so that people have a familiar face they can call with their questions," she says.

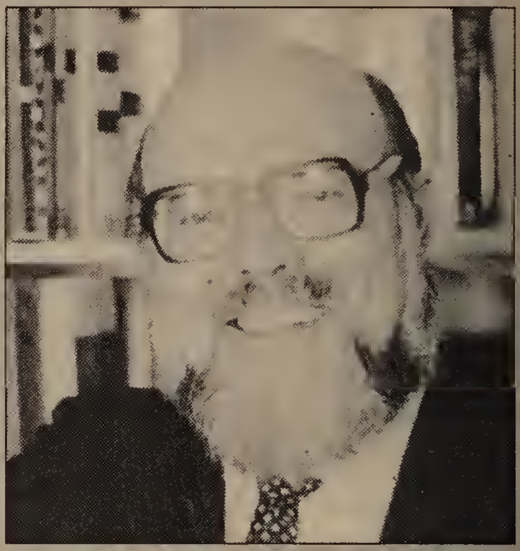
This personal approach also encourages users to take advantage of a walk-in support center that Manufacturers Hanover's training department runs. "As soon as they get to know an instructor, they'll come to the walk-in center," Allridge says.

Instructor-led courses offer another advantage over CBT in that some organizations find them easier to customize. At Fidelity Investments, for example, instructors rely heavily on real-world examples, which they use to reinforce company standards.

The company offers CBT in addition to live classes, but Stoudard sees little demand for it. "We have a dozen CBT packages in each major software package," he says, "but we always have some on the shelf." He

Continued on page 54

Expert's Opinion



Management consultant Quick

Trainers deserve leadership role

By THOMAS QUICK

Recently, a well-known management consultant angered a group of senior corporate trainers when he reminded them that they sit in leadership positions and should feel obligated to influence their organizations' strategic plans. His message was a complimentary one, but they did not want to hear it.

Many training professionals, even at high organizational levels, prefer to follow rather than lead.

These experts' reluctance causes much training and development to fall short of its potential. At the least, the training is not cost-effective; at most, it is ineffectual.

When professional trainers shy away from initiating programs, managers in MIS and other departments often determine what type of training their department will sponsor and who will receive it.

Most managers lack the professional trainer's expertise in human resource development, however. They can easily choose inappropriate kinds of training or select the wrong trainees. Of course, department managers need to assume responsibility for their employees' training. But they also need help in identifying training needs and fulfilling them.

If they choose programs without trainers' guidance and choose poorly, their organizations' products will not get made as well as they might, services will not get delivered as efficiently as they should, and costs will escalate.

With the stakes so high, managers in MIS and other divisions should insist that trainers get involved in strategic planning, yet often they do not. The reasons — or the faults — lie both with managers and with training professionals.

On the managers' side, the faults

See **QUICK** page 54

Quick is executive director of the Resource Strategies Institute, a training and development firm based in New York. He produces two monthly newsletters, "Professional Managing" and "Professional Selling," for the institute.

ONLY A MASTERPIECE OF FINANCIAL SOFTWARE CAN INTEGRATE THESE APPLICATIONS ON YOUR IBM MAINFRAME, DEC VAX OR IBM SYSTEM/38.

Being able to immediately integrate all of your company's financial information is a tremendous advantage to sound corporate decision making.

To selectively consolidate corporate-wide reports. To combine data from accounts payable and accounts receivable with purchase orders, general ledger and fixed assets anytime, any day.

The Masterpiece® Series does this for you.

It's the only complete portfolio of financial software with full integration features for your IBM mainframe, DEC VAX and IBM System/38—native to each environment. As such, it gives major corporations uniform financial reporting, even from multiple-machine environments.

You'll find Masterpiece to be faster, more powerful and more intelligently designed than any other financial software.

Faster, because information access is enhanced by "borderless" integrated applications. All applications share the same familiar English-like commands and screen prompts, so they're easy to learn and quick to use.

More powerful, because Masterpiece includes a unique query and reporting system that gives even the occasional user a comprehensive tool to instantly retrieve information in virtually any report format. Yet, MasterSecurity™ provides an advanced safeguard against unauthorized access.

And more intelligent, because its efficient, modular design lowers DP/MIS maintenance and raises user productivity while expanding your future options.

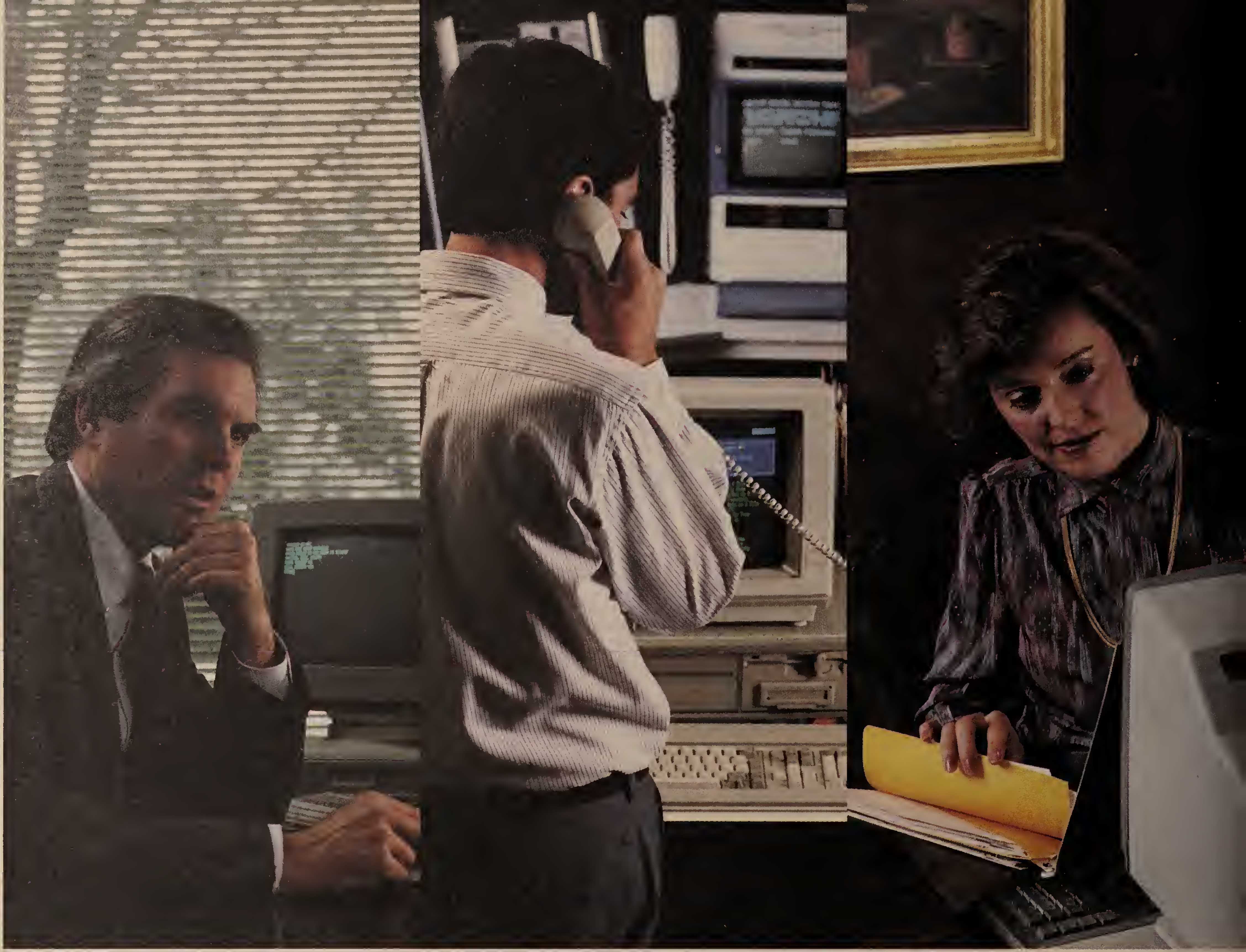
Call or write for a copy of our 40-page brochure on how to integrate all of your financial information while gaining the security of doing business with General Electric's Software International—providing support for thousands of IBM mainframe, DEC VAX and IBM System/38 users from 30 offices worldwide.

1-800-343-4133 (In Massachusetts 1-800-322-0491)
One Tech Drive, Andover, MA 01810-2497

Masterpiece and MasterSecurity are trademarks of Software International Corporation. IBM is a registered trademark of International Business Machines Corporation. DEC and VAX are registered trademarks of Digital Equipment Corporation.

SOFTWARE
INTERNATIONAL

masterpiece®



So the DP Manager said,
"Every day I face the challenge
of making people more productive
while controlling costs."

And we said, "It's simple with MAGNA 8."

The multiple personalities of MAGNA 8* help you face the needs of programmers and non-technical users alike—while you control costs.

MAGNA 8 is fourth-generation software from Honeywell that can dramatically improve programmer productivity, while making your computer more accessible to knowledge workers throughout your organization.

With MAGNA 8, you can use a single product for data management; prototyping, application and code generation, report writing, and ad hoc queries. All this from an advanced language that's easy to use.

With this one 4GL to meet diverse needs, you not only can save the cost of multiple products, you can save multiple training and support costs.

And because it's for Honeywell GCOS 8 large systems, MAGNA 8 is backed by a tradition for excellence, and a superior worldwide service network.

For more information on this exciting fourth-generation language, call 1-800-328-5111, ext. 2773 or write Honeywell Inquiry Center, MS440, 200 Smith Street, Waltham, MA 02154.

Together, we can find the answers.

Honeywell

*MAGNA 8 is a registered trademark of MAGNA Business Systems Corporation.

Continued from page 50

does not know why, exactly, but says, "They do tend to be a little boring."

Fidelity's information center provides computer-based introductions to 1-2-3, DOS and Ashton-Tate Multimate, and instructors encourage students to use the programs to reinforce class work. The firm's most popular CBT course, however, is an application that teaches touch typing.

Many training managers feel that CBT deserves a more prominent place in training programs for three main reasons:

- It offers flexibility, because users can learn at their own convenience.
- It comes prepackaged and does not need to be developed in-house.
- It is less expensive than other training media.

Managers find the last bonus especially tempting, but before they invest in CBT, they want to test its effectiveness. CBS Magazines' Lisko got the chance to do so recently, when a vendor offered to let the division work with a CBT course free for 60 days. Only members of Lisko's staff are participating in the pilot, which began in early April.

Some managers determine which training method to use primarily by comparing direct costs for classes and materials. According to this criterion, self-study programs seem inexpensive. But training itself rarely represents the most significant cost of a complete program. Students' time often costs much more. With employees' time factored in, the price of self-study rises.

Self-study methods like video and CBT are most useful in three situations:

- When people require immediate training in a new subject and the company's training staff cannot develop and deliver a course on time.

Continued on page 56

> **”**
>
> ***Because of the uncertainty about end-user training's rightful place, turf battles break out often.***

QUICK from page 50

arise from a negative view of training that becomes a self-fulfilling prophecy.

Most managers feel skeptical about the effectiveness of training, especially in "soft" areas — topics like management training where trainers claim to teach vague skills such as decision making, problem solving, planning and innovation.

Because of this skepticism, managers frequently commit themselves only partially. They approach training almost the way they might order eggs: once over lightly, and the complex training that employees require gets reduced to short classroom sessions — far too short for employees to practice their new skills.

This training accomplishes so little that it might as well have never taken place. The managers who sponsored it feel that they should have saved their money. Naturally, they had set themselves up for exactly this result.

Skepticism and halfhearted commitments often set a fad trap, in which managers fall prey to any training program that promises a quick and easy fix. When the program fails — as, of course, it will — the failure reinforces the skepticism.

Trainers themselves further bolster management's skepticism with their reluctance to take charge of strategic planning. This reluctance, which serves as a major impediment to successful training projects, comes from three sources:

Tradition. Over the years, both trainers and managers have regarded training and development as low-priority functions — a fact demonstrated in virtually every recession.

Furthermore, the training department's reporting relationships are not strong. In many hierarchies, trainers report to a director or vice-president of human resources. It is not a power track.

Credentials. The exponential growth of the training field has opened doors to many people with little background or experience.

These neophytes receive in-house training to bring them up to speed in training others. But the training is typically so highly specialized and narrowly focused that it cannot prepare the new employee to take part in top management planning.

Business competence. Many of today's entrants to the training field come from the public sector, chiefly public education. They lack a knowledge of corporate life.

After training, they may know something of their product, but they do not understand their clients' needs sufficiently. In the clients' eyes, these trainers lack credibility. They cannot talk the language, and they have trouble diagnosing problems and prescribing solutions.

At the risk of sounding simplistic, then, the situation in many organizations involves two groups — trainers and their clients — who need each other but find it difficult to communicate. To get satisfactory results out of training programs, both camps will need to move forward.

Certainly, the situation calls for an increase in professionalism among trainers and human resource developers. It also calls for a realization among managers that unless they make a genuine commitment to training they will not be as effective as they want and need to be. ■

Life-sized
COBOL

SORT 10,000 100-byte records in 43 seconds.
Load 10,000 100-byte keyed records in 36 seconds.
Compile a 10,000 line program in 76 seconds.
Search a 10,000 line source file in 16 seconds.

Hundred-line COBOL programs are common in benchmark tests. In real life, you deal in thousands of lines. So does REALIA.

REALIA is the fastest micro COBOL. It can handle the biggest files. But speed and capacity are only the basics. The compiler, GSA-certified at the high level, offers IBM VS COBOL compatibility and supports ANSI 85 features, such as inline PERFORM and END-IF.

COBOL programs can call DOS, C, and assembler subroutines, as well as accessing BIOS functions via the machine-level interface. The indexed file system handles multiple alternate indexes, with a maximum record size of 32Kb. The interactive symbolic debugger works on your native generated code, instead of requiring an interpreted version. The full-screen editor imposes no limits on file size.

The programs you write are yours to distribute: REALIA charges no run-time or royalty fee.

REALIA gives you the tools you need for real-life development and maintenance projects. Fast, high-quality phone support. Automatic shipment of upgrades, free for the first year. An introduction to the independent REALIA User Group. A 30-day evaluation copy, for qualified companies. Call us.

Get Realistic about COBOL.

$995 Includes the compiler, interactive symbolic debugger, editor, and a year of free upgrades and support. Visa / MasterCard / American Express accepted.

REALIA™ COBOL requires MS-DOS™ 2.00 or above; an IBM PC™ PC-XT™, PC-AT™, 3270 PC™, or compatible; and at least 160Kb of memory.

REALIA™ inc.
10 South Riverside Plaza
Chicago, Illinois 60606
(312) 346-0642
Telex 332979 REALIA INC.

Executive seminars draw top managers, rally support for PCs

When the president of a major corporation requests training in an end-user application, the wise training manager does not place him in a class full of secretaries and middle managers. Most upper level executives have special training needs and want to learn with their peers.

If an MIS or information center manager satisfies executives' desires by providing special training sessions, he may derive a windfall for his own department. Executive-level seminars can alter top managers' perception of the personal computer and lay foundations for the future expansion of information systems.

Executive seminars played a large role in a plan for encouraging companywide PC use at Continental Grain Co., a multibillion-dollar international firm based in New York. Before the plan took effect, only clerical employees had used personal computers. And, according to Hilly Fuchs, director of Continental Grain's information center, middle managers were reluctant to join the ranks.

"Their reaction to the idea of using the PC was, 'What, should I become a typist?' " Fuchs says. "On the other hand, they were in a position where they didn't understand the technology used by their own staff."

The information center staff decided to skip over middle managers and target top executives, expecting acceptance to trickle down. If the plan worked, middle managers would come to feel pressure on two fronts: Both their bosses and their employees would expect them to learn about the personal computer.

The Continental Grain executive training program was conducted by an outside training firm and consisted of four half days of instruction. Classes covered minimal basic hardware considerations and introduced Lotus Development Corp.'s Symphony software package, a standard at the firm.

Other firms that offer executive training follow similar formats, although some lean more heavily toward a management slant, addressing topics like the integrity and security of data. Classroom examples tend to emphasize the personal computer's utility in "what-if" analyses and budget projections.

The general curriculum of executive seminars, however, resembles that of standard employee training programs. The main difference — and the chief reason behind the seminars' success — is the homogeneous audience.

According to Louis Lisko, director of end-user computing at CBS Magazines, the consumer publishing division of CBS in New York, "There's a comfort factor in having directors grouped with each other for training." At CBS, all employees at or above a specified rank are automatically placed into an executive class. The curriculum for the class is the same one the company uses for its introductory personal computing course.

"While executives are probably not going to utilize the product, they will need to know what the people who report to them do," Lisko says.

Grouping executives together also allows them to benefit from each other's ideas. Questions that one top manager asks tend to pertain to other top managers as well. They raise such questions more readily when they are among their peers.

If a class consists of executives exclusively, the arrangement provides a benefit for teachers as well as students. According to Colin Cuskley, director of training with the Productivity Center, a New York training firm, "The instructor can guide the discussion with questions like, 'How do you think your people will react to the program you just learned about?' " Cuskley taught the executive training seminars at Continental Grain, which met with great success.

One of Continental Grain's true achievements was its ability to attract executives to executive seminars, a difficult feat in personal computer training.

For political reasons, executives need to receive an invitation to participate from someone they consider a peer. At Continental Grain, the arrangements went smoothly because the idea for the training had originated with an executive.

Paul Cantor, vice-president of financial and administrative systems, not only initiated the seminars but also hand-chose the first participants, knowing they could make or break the effort.

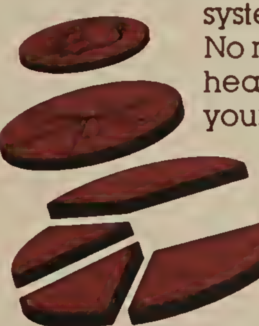
Cantor also joined the class himself, thereby cementing support for the effort. Personal computer use caught on quickly. In their enthusiasm, a number of executives purchased machines without even waiting for the course to conclude.

Right now, Continental Grain's executive training program is logging yet another achievement. As planned, middle managers are beginning to call for training, citing recommendations from a boss or an assistant.

— SHARON EFROYMSON

Control your DP costs...
Document your resource needs...
Chargeback is the answer!

Complete OS/MVS Resource Accounting.
KOMAND was designed from the beginning as an OS/MVS chargeback system—NOT a DOS system in disguise. No matter how heavy the traffic in your MVS shop, it accounts for those data center resources used. Then it allocates the true costs of any job to user budgets, where informed decisions can be made about cost vs. worth of that job.



Dollars Help Manage Resources.
KOMAND was designed from the beginning as a chargeback system, NOT an appendage tacked onto the tail end of a capacity planning system. Of course, the KOMAND output is valuable to capacity planners to help analyze cost effects of job mix and hardware changes, manage peak loads, and most important, to communicate to management and users in terms they know best—DOLLARS.

Overhead Hides Costs.
KOMAND was designed from the beginning to catch all the resources hiding in overhead, and to let you and your users know their cost. It's NOT a system that reburies costs as overhead, to be distributed in incomplete invoices—or that doesn't give you detailed backup when you need it.

"Top MAUR Rating"
—DATAPRO

Top Rating for KOMAND.
DATAPRO's December 1985 user survey gives KOMAND top rating (above its principal competitor) in all categories with a Mean Average User Rating (MAUR) of 8.24 on a scale of 10.

■ Move up to KOMAND!
Call the chargeback specialists at PACE for more information on KOMAND.

KOMAND®
The choice of those who know

PACE Applied Technology, Inc. ■ 7900 Sudley Road ■ Manassas, VA 22110
Call Today! 703/369-3200

Survey

View from across the desk: Trainees offer tips on courses

By DAVID NEEDLE

Business users rarely agree on the merits and drawbacks of a particular micro training course, but they do hold similar opinions of classes in general. *Computerworld* uncovered three common views when it interviewed recent trainees:

• **View 1: Finding the right training facility and the proper class structure is essential to success.**

After three years of using an IBM Personal Computer, Marina Von Bothmer decided to take a course in advanced DOS. Von Bothmer, conference manager in the public affairs department at Citibank NA in New York, wanted to explore batch files, subdirectories and other mysteries of the PC.

Because Citibank did not offer the type of course she needed, Von Bothmer went looking on her own. After a phone call, she chose the PC Executive Training Center in New York as her school.

"I called them up and asked them to read a description of the course," she says. The description listed the commands and tasks the course would cover, and the list matched Von Bothmer's needs.

Courses at the center are a mix of lectures and hands-on training exercises, with emphasis on the latter. Von Bothmer says the approach suits her well. "I'm one of those people that if I'm not doing it, I don't understand," she says.

She also likes the ratio of students to instructor (7:1) in her class and her instructor's attitude. "I can't say I've been to a lot of different courses, but we've had in-house consultants who made me feel stupid." In contrast, instructors at the center evaluate their classes and adjust courses to their pupils' level, she says.

Von Bothmer has enrolled with the center for a number of one-day classes on different topics. She says she appreciates the short duration, noting that she typically cannot spare the time to take longer courses.

• **View 2: Picking appropriate training courses is crucial because poor choices can lead to discouragement.**

Christina Bonilla, a manager at Pacific Bell in San Francisco, got off to a bad start in her first computer course, an introduction to Lotus Development Corp.'s 1-2-3, because she had never used a personal computer before. "I didn't even know how to put the disk in the drive," she says, "and the course assumed you knew the basics."

Nevertheless, she perservered. After the one-day Lotus class, she tried again with a half-day introduction to the Microsoft Corp. MS-DOS operating system, which helped her feel comfortable using the IBM Personal Computer in her office. She went on to a more advanced MS-DOS class and finally to three one-day courses in 1-2-3.

The class schedule gave Bonilla a chance to work out the basics before moving on. "When I got stuck on something, I'd bring it to the next course and figure out how to do it," she says.

Two instructors taught the Lotus courses to 12 students using a combination of lectures and hands-on training, at an easygoing pace with which Bonilla felt comfortable. "It was done in a very organized way, so I was not overwhelmed," she says.

Bonilla took all of her classes from the same training company, Know How, Inc. of San Francisco, and found them all helpful. The Pacific Bell office had been disappointed with other courses from another training company whose instructors lectured too much and did not provide enough hands-on experience, according to Bonilla.

• **View 3: Learning personal limitations can be as valuable as learning a specific software package.**

Ronald Kilbaugh needed to learn how to program in Ashton-Tate's Dbase III — at least he thought he did.

In his job as regional production manager in charge of eight plants for W. R. Grace & Co. in West Chicago, Ill., Kilbaugh had long realized the benefits of using a personal computer. He had learned Lotus' 1-2-3 on his own and used the package regularly to help with some of his financial analysis and planning responsibilities.

But he knew he would have to spend long hours pouring over books and documentation to figure out the best way to use Dbase III, an advanced data base management program. Instead, he decided to take a one-week seminar at a summer computer institute at the University of New Hampshire.

Before long, Kilbaugh realized the topic was too advanced for him. "I was just starting in with Dbase, so the course was over my head; it was structured on a higher level. The people who had already worked with Dbase probably got a lot more out of it," he recalls.

He did learn one important lesson, however. "The course taught me I didn't have the time to take all the necessary training." Had he skipped the class and set out to explore Dbase III on his own, he says, he might have spent many months rather than a single week coming to the the conclusion that he would never master the product.

Kilbaugh took something else away from the experience. He ended up hiring the instructors from the course to do programming for his company. ■

Needle is a Menlo Park, Calif.-based free-lance writer specializing in computers and technology.

Continued from page 54

• When employees cannot spend an entire day in training.

• When the company wants to export training to remote sites that instructors cannot reach.

Whenever budgets allow, managers like to offer a variety of training media to suit users' varied needs. Bill Shannon, information center manager at Pitney Bowes, Inc. in Stamford, Conn., for example, says a mixture of instructor-led training and CBT classes provides ideal end-user education. "I think people learn in different ways," he says, and he would like to accommodate them.

Whatever medium a company chooses, its training manager and his staff will sometimes need help getting through a difficult stretch. At such times, outside training vendors offer relief.

An outside training vendor can handle overflow during heavy periods, for example, thereby easing the burden of erratic course registration patterns. A vendor can also step in and supply up-to-date instruction whenever the in-house training staff falls behind in new course development. If a training staff's time is severely limited, an outside vendor can even provide regular supplements to existing courses.

> ❞
>
> ***In every company where training is voluntary, a block of users refuses to enroll. Ignorant users can burden an information center with their support needs so training managers should do all they can to keep this block small.***

Pitney Bowes' information center turned to an outside vendor for yet another reason — to help it survive growing pains early on, when the center's limited staff was faced with heavy demands for training.

When the personal computer population at the firm grew past 150 a year and a half ago, Pitney Bowes assigned responsibility for support and training to Joyce Woodard, a staff PC coordinator.

When she took the job, Woodard faced more than 300 outstanding applications for training. Needs seemed likely to soar even higher, because the number of personal computers in the firm continued increasing.

To cope with PC training needs, Woodard turned to an outside vendor — the company that had sold Pitney Bowes its personal computers in the first place.

To cover costs, the information center instituted a chargeback policy. Operating departments paid $65 for each student's training.

By unloading training responsibilities on an outside group, information center staff members gained time to work on user support, which Shannon considers their primary activity.

The information center is now safely past the initial crunch, having educated more than 550 end users, but Pitney Bowes continues to rely on the outside training vendor for all of the firm's PC training. Woodard has been promoted to manager of MIS education.

In-house training departments that cannot use outside training programs often have trouble juggling their teaching and course development responsibilities. In a crunch, they tend to emphasize teaching, mainly because top management measures success by the number of users trained. But this trade-off brings trouble down the line: If trainers do not allocate time to developing courses, quality will suffer.

The 3-year-old information center at the Philadelphia Savings Fund Society (PSFS), a financial institution with headquarters in Philadelphia, is currently bearing the brunt of such a trade-off.

Trainers at PSFS function as trainer/analysts: Besides teaching end users, they need to test new releases, research new technology and carry out other duties. The results are predictable.

"We're a little behind in developing courses due to the conflict in priorities in our job functions," says Susan Derrickson, one of four trainer/analysts. "If we had more time, we'd be updating our current courses, becoming more knowledgeable about the products we teach and developing more courses."

Derrickson says she would like to develop, for example, separate word processing courses for professional and clerical staff members who are currently lumped into the same class.

The information center tried to make time for course development work when it scheduled a blackout on micro training courses last September, a move intended to allow trainer Gail Heinzeroth to research and write much-needed courses in Ashton-Tate's Dbase and On-Line Software International, Inc.'s Omnilink. The month-long break proved insufficient, however. Heinzeroth finished the Omnilink course afterward, but the Dbase course remains under development.

In a more promising development, PSFS recently doubled its training staff from two trainers to four.

Office automation training includes courses in file creation, electronic mail and calendaring. Microcomputer training covers general PC literacy as well as introductory and advanced courses in 1-2-3, DOS, Multimate, Omnilink and Ashton-Tate's Dbase III.

With two trainers assigned to either area, one trainer can drop out to develop courses for a month or so while the other keeps up with training needs. Heinzeroth says quality has improved as a result.

Still, the Dbase course remains incomplete. To tide users over, Heinzeroth hands out interactive diskette tutorials. End users at PSFS can also borrow books and video courses from the information center.

Even as work continues on the Dbase course, the training staff at PSFS is forging ahead with a bold project to move successful courses

Continued on page 62

Selective shopping yields greatest training payback

'Real-world' instruction key to user satisfaction

Ideally, computer training courses should dovetail computer manuals, providing complementary information that helps users learn.

But, warns consultant Richard Riddington, "There can be a real gap between the learning environment and the real world."

Riddington, a principal with the consulting firm Soft Industries Corp. in Southington, Conn., recalls attending a microcomputer software training session in which the instructor used a great number of creative terms to help explain certain procedures.

It would have been a nice addition to the training session, but the terms appeared nowhere in the product manual, he adds.

Trainers should never "create a separate frame of reference in the training environment that you won't have when you're back at your computer," Riddington stresses.

And potential students should check to see that their instructors plan to go by the book before signing up for a class.

After taking more courses than most users and giving a good number of courses as well, Riddington feels qualified to dispense that and other tips for users who want to spend their time and training money wisely.

Richard Riddington

> *'The very first thing you have to ask yourself before you sign up for a course is, "What do I expect to get out of it?"'*

"The very first thing you have to ask yourself before you sign up for a course is, 'What do I expect to get out of it?' " he says.

Course requirements differ for a person who wants to explore a field before he buys a microcomputer product and a person who has bought a product and now wants to learn to use it.

Riddington says that potential students can look for obvious clues that tip them off about a course's focus.

Students who want to learn to use a specific program, for example, should steer clear of any course that promises to cover 10 different programs.

"The course won't go into depth in any one program," Riddington explains. "If you go to learn one program, then you probably will not be satisfied."

Even courses that focus on a specific program do not always supply the in-depth or hands-on instruction and experience that students expect.

Riddington once took a lackluster class in Ashton-Tate Framework II, a lecture and dicussion he describes as a hands-off seminar. The course was a disappointment to him because he had wanted to learn how to use the program.

"The hands-off course can be like an in-depth magazine review," he says. "You still don't get skills, and people don't want to pay [high course fees] for what they can get from a magazine."

Riddington also suggests that potential students check to see that the course they plan to take uses real-world examples — not just exercises — to help students memorize commands.

"We don't tend to retain info from memorization," he says, "but from such things as 'We will set up a budget' or 'We will do a P and L' that sound similar to what we do in the office."

— DAVID NEEDLE

PACS for VAX for PACS for VAX for PACS for VAX for PACS for VAX

VAX CHARGEBACK MADE EASY

More than 1,000 VMS sites know that chargeback, resource accounting and capacity planning are a snap . . . using PACS™ PLUS. Whether you have a single VAX, a VAXcluster or network, "PACS PLUS will fill the resource management needs of any VAX installation . . ." (DEC Professional Product Review, Feb., 1986).

FOR A FREE TRIAL
CALL TOLL-FREE 800-235-5787

STi Signal Technology Inc
5951 Encina Road • Goleta • CA • 93117 • (805) 683-3771

Yes, send more information on PACS PLUS.

Telephone: (   ) ____________ VAX model(s): ____________
Name: ____________ Title: ____________
Company: ____________ Div/Dept: ____________
Address: ____________
City: ____________ State: ____________ Zip: ____________
COWK
I'm interested in: ☐ chargeback ☐ resource accounting ☐ capacity planning
☐ free trial ☐ DEC Professional reprint.

STi Signal Technology Inc
5951 Encina Road • Goleta • CA • 93117 • (805) 683-3771

VAX, VMS and VAXcluster are trademarks of Digital Equipment Corporation.

Are you wired for productivity?

Tap into the latest trends in technology with IDC's Executive Video Conference Summaries on Telecommunications and Office Automation.

Each of these professionally produced IDC programs consists of six 30-minute video tapes. Now you can keep up with timely issues—and choose the time to do it.

Telecommunications Program: Experts discuss data communications goals, case histories, trends and the impact of the AT&T divestiture.

Office Automation Program: Authorities present the technical and psychological aspects of technology, micro to mainframe links and LANs.

These IDC Executive Video Conferences are brought to you by ASI, the leader in technology education. For more information or to place your order, call today.

1-800-238-2625
In Illinois: 1-800-238-2626

IDC
INTERNATIONAL DATA CORPORATION
ASi
155 East Algonquin Road
Arlington Heights, Illinois 60005

© Copyright 1986, Advanced Systems, Incorporated.

Build or buy? Managers must weigh CBT tool options

By LARRY BRINK

End-user expectations have forced many companies to reposition training from a low- to a high-priority item.

Due to this shift, managers are paying more attention to a particular set of competing solutions — in-house development of training products vs. vendor development of training products. Both options can be appropriate solutions to training needs.

When it comes to the design and development of computer-based training (CBT) tools, however, there are several key questions managers should consider before making a decision.

CBT is a complex instructional medium — even seasoned instructional designers may have an insufficient background for dealing with it effectively. Therefore, CBT development should be approached with respect.

Whether it is done inside or outside, time, money and effort are required to create an effective training product.

The following list of considerations can help managers clarify their CBT development options:

- **Company business needs and goals.** The decision of how and where to develop CBT projects may be dependent on corporate strategies.

> ***A corporation that plans to use a CBT program as a critical part of a major new product or service may be smarter to go outside and have the CBT training program developed rather than risk a less-than-professional first attempt at CBT.***

A corporation that plans to use a CBT program as a critical part of a major new product or service may be smarter to go outside and have the CBT training program developed rather than risk a less-than-professional first attempt at CBT.

This strategy was used by one well-known software company when it introduced its first business application.

Having spent millions of dollars on research and development and with knowledge of what it takes to compete in today's marketplace, the company decided to spend a quarter of a million more to buy a professionally designed and developed CBT tutorial.

Since the stakes were so high, and since the company had little need for full-time CBT developers, the decision to go outside was smart.

On the other hand, any company that has a corporate mandate to generate significant numbers of CBT courses should consider in-house development.

Another option these companies have is to work with a vendor or a consultant initially to learn CBT basics and move gradually to create an in-house CBT development group.

Once the group is functional, outside vendors can always be used for difficult, high-visibility jobs that would stretch resources.

Companies that want to run a pilot project to examine the feasibility of the medium may also want to use the option of working cooperatively with an outside vendor.

- **CBT project schedules and budget status.** Schedules and budgets are two more elements that should be considered when making CBT development decisions.

Those companies that are inexperienced in the development of CBT projects and yet are faced with short time lines for building a major CBT program have no choice but to go outside for development.

Training vendors can staff up and get the job done quickly — although they will charge extra because of the tight schedule.

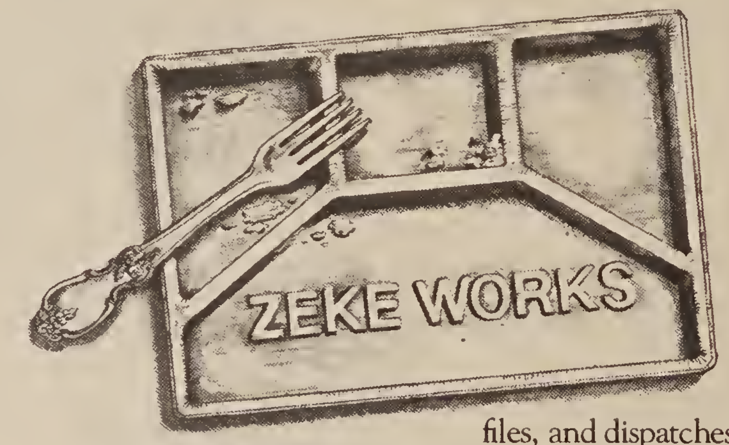
When time lines are more reasonable and controlled, however, companies can take the opportunity to hire an in-house staff to handle further CBT development.

Companies that are responsible

See **BRINK** page 60

Brink is a principal of Apogee Training and Development, Inc. in Newton, Mass. He has developed instruction programs using a wide variety of media, including the computer-based training format.

Why is Stouffers hot for Zeke:



The thought of life without Zeke automated scheduling gives Stouffers a chill. "Our operators rely on Zeke," says Data Center Manager Craig Kodat. "They don't want to go back to the old way of doing things.

"Zeke prevents out-of-order submissions, provides for automatic restart and restoration of files, and dispatches batch jobs automatically. It takes quite a burden off us!"

Faster throughput. Fewer reruns. Greater productivity.

Zeke works for Stouffers.

Why not put Zeke to work for you? ZEKE

The scheduler that works.

SOUTHWEST SOFTWARE
Software that works.
813 Great Southwest Parkway Arlington, Texas 76011-5428
(817) 640-8911 (answered 24 hours a day) 1-800-227-7774 (outside Texas)

Start your job on a PC... Finish it on a VAX.

V-DRIVE

V-DRIVE is a unique PC to VAX link. V-DRIVE creates a network for your PC users, using the VAX as a sophisticated file server. Advantages: PC information is stored on VAX hard disks and is automatically backed up with the VAX. PC users can move between PC-DOS applications and VAX mail or VMS with a single key stroke. VT 220 terminal emulation is built-in. PC data can be shared or private. Read-only or read-write. No new commands to learn. Easy. Your VAX or MicroVAX™ becomes a superb file server, and your PC users are integrated neatly into the VAX environment.

Plus, if you have VMI's BRIDGE System, terminal users can run the same PC software, sharing the same data as the users with V-DRIVE. And the low cost will impress you.

virtual microsystems

415 • 841-9594

Virtual Microsystems, Inc., 2150 Shattuck Avenue, Suite 300, Berkeley, CA 94704

Trademarks: V-Drive, BRIDGE-Virtual Microsystems; MicroVAX—Digital Equipment Corporation; dBASE III-Ashton-Tate.
Registered Trademarks: LOTUS—Lotus Corporation; Wordstar—MicroPro Internation, VAX—Digital Equipment Corporation

IBM System /36 users.

Make this phone call or you'll never know what increased main storage can do for you.

If you want 512KB or 256KB memory cards for your IBM™ System/36, your choice is simple.

Wait for IBM to deliver its newest feature.

Or call EMC and get immediate delivery.

Why you need more main storage in the first place.
Insufficient main storage is the single biggest limitation on the performance of your System/36.

That's because every user, application and peripheral requires main memory.

By simply adding more main storage, you automatically speed up response time and improve productivity.

What makes EMC add-in memory better.
To start with, EMC's new 512KB and 256KB memory cards utilize 256K RAM technology. Our 256KB card, for example, has almost 50% fewer components and interconnections than IBM's. So it's inherently more reliable and consumes less power.

What's more, every single EMC memory board undergoes a rigorous 100-hour test and burn-in procedure in one of our own System/36's.

Our quality control pays off, too. Of the thousands of EMC memory boards installed in System/38's, *not one* has ever caused unscheduled system downtime.

We've installed more memory in IBM minis than any other independent supplier.
Our customers include leading Fortune 500 companies, such as Allied Bendix, Equitable Life, Campbell Soup Company, GTE and Bank of New York, to name but a few.

And the list is growing longer every day. For obvious reasons.

EMC is the only manufacturer of add-in memory to offer you an *unconditional lifetime warranty.*

And EMC memory boards are 100% compatible with your System/36. They fully support all IBM memory and memory diagnostic routines—*and do not affect your IBM maintenance agreement in any way.*

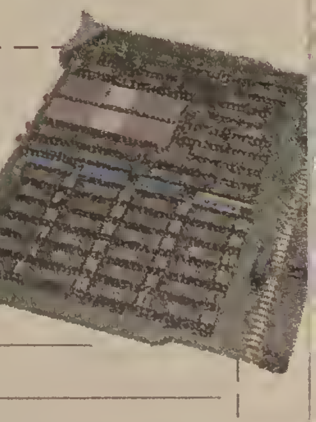
Better yet, EMC's new 512KB and 256KB memory is priced a full 25% less than IBM's comparable memory. Our volume discounts and trade-up credits can make your savings even greater.

100% money-back guarantee.
If you're not 100% satisfied with your EMC memory for any reason, simply return the board within 30 days and we'll *refund 100% of your money.* No questions. No hassles. And of course, no waiting.

To place your order for immediate delivery—or for more information—just call the toll-free number below today. Or mail the coupon to: EMC Corporation, 12 Mercer Road, Natick, MA 01760.

To order or for more information, call today:

1-800-222-EMC2
(In MA, call 617-655-6600)



YES, I'm interested in EMC memory for my System/36.
For Model(s)________
Name________
Title________
Company________
Address________
City________ State____ Zip______
Phone________
Mail to: EMC Corporation, 12 Mercer Road, Natick, MA 01760. CW-5-5

EMC^2

No one is more committed to memory.

European Headquarters: In London (088385) 2434,
International Number -44 88 385 2434. U.S. TELEX 948615.

IBM is a registered trademark of
International Business Machines Corporation.

BRINK from page 58

for multiple projects — those that run in parallel and require significant numbers of developers, support staff (data entry, quality assurance, word processing) and management control — may want to split the work load between a vendor and an in-house development staff.

In this case, it is reasonable to contract out the toughest pieces of the project and use the designs and outlines provided by the vendor to save internal design time and effort in the future.

CBT budgets often reflect corporate commitment. In effect, if a company has a short-term commitment to CBT, it is often cost-effective to use outside vendors where hardware, software (authoring tools), start-up time and hiring fees have to be considered.

For a company with a long-term commitment to CBT, it is feasible to establish an in-house group that can meet most, if not all, corporate needs.

• **Project resources.** The availability of experienced CBT developers and project managers is another consideration that should weigh heavily in in-house vs. out-of-house development decisions.

> ”
>
> ***CBT budgets often reflect corporate commitment. If a company has a short-term commitment to CBT, it is cost-effective to use outside vendors. For a company with a long-term commitment an in-house group can meet most, if not all, corporate needs.***

If the time and budget for an employee search is available, knowledgeable vendors, consultants and other training managers with CBT development experience can be sources of information concerning the job descriptions, requirements and competitive salaries offered to qualified candidates.

Unfortunately, due to the newness and complexity of CBT, qualified candidates for in-house positions are sometimes hard to find.

CBT development also demands that investments be made in hardware and special authoring software.

While people resources are vitally imporant for good program development, the technology and tools that designers need must be factored into the decision process.

The dollars for such resources are easily cost-justified when a substantial commitment to CBT development has been made by senior management.

Although there is no simple answer to the issue of in-house vs. vendor development of training materials, when managers consider immediate and long-term business plans, a sound decision can be made. ■

Humor, interactivity enhance CBT training

Student participation key to learning process

By JANET FIDERIO

Computer-based training (CBT) programs might benefit from a little fun and games. In fact, some consultants are saying that the judicious use of humor or appropriate game techniques, when combined with interactive designs, may be the deciding factor in a student's decision to stick with a training program and finish it.

Student acceptance of CBT should be of more than academic interest to MIS and training managers because the number of CBT programs in corporate training arsenals is growing. These programs — used either as primary training techniques or as backup techniques for live or video training courses — are purchased with increased frequency because of their low price, wide availability and ease of use.

What MIS and training managers should understand before purchasing or developing CBT products in-house is what makes good CBT, or more important, what makes interesting CBT in the eyes of the student.

Consultants and training vendors are quick to emphasize the importance of interactivity in CBT designs.

They strongly discourage the use of static techniques such as simple page-turning programs, in which students are required to read page after page of electronic text. The training experts encourage the use of techniques that require the student to control or participate in the learning process, such as moving forward or backward, answering questions in a simulation or completing exercises.

Fiderio is a Computerworld *senior editor.*

Harris Sussman, a manager of special projects at Digital Equipment Corp. in Bedford, Mass., and designer of DEC's "Decision Point," a highly interactive videodisk program for management training, takes the concept of interactivity one step further.

Sussman's comments at the recent Computer Based Training Conference in San Diego reflect his philosophy that electronic-based training should be more social in nature. "A program is interactive if it gets the people who are working on it to interact with each other" he says. "But a program is very successful if it generates discussion, argument, exchange of any kind, between those people who have been exposed to it," he adds.

> ❞
>
> ***Consultants and training vendors are quick to emphasize the importance of interactivity in CBT designs. They strongly discourage the use of static techniques such as simple page-turning programs, in which students are required to read page after page of electronic text.***

Sussman also advocates the use of humor in electronic learning environments. When other CBT professionals commented on humor and its importance as an ingredient in interesting CBT courseware, a variety of opinions emerged.

David Lichtman, president of ECA, Inc., an Arleta, Calif., CBT vendor, says humor is wonderful if it aids the training process, but that it should never detract from it.

Lichtman states, "The ideal training program is one in which the students are not aware they are being trained because they are so focused on the application or the task they are learning. In that sense, the use of humor has to be very judicious, because if they are really into performing the skill, tricks are not needed to keep them involved." Lichtman feels humor might actually upset their concentration.

Marilyn Albin, principal and creative director at Micro Training Associates, Inc., a Canton, Conn.-based custom CBT development firm, concurs with Lichtman's position that humor be used judiciously, but for slightly different reasons. According to Albin, humor should be used carefully because it can trivialize the student's training experience.

She also thinks students may find some types of humor offensive. "Humor is often very regional in nature, or specific to a particular cultural or organizational group. For that reason, it is difficult to use well and in a way that is appropriate for all members of the student audience."

For Albin, games can be an effective tool in CBT design not only because they are fun for the student, but also because they can be used to demonstrate increased proficiency.

"The reason why students enjoy CBT games so much is the element of competition" she says. "The problem that holds us back from developing more games is that their design is very time consuming."

Catherine Mambretti, president of Icon Associates, Inc. an Oak Brook, Ill., computer-based training company, feels that in the ideal situation most students would prefer a little humor, and "if the subject matter lends itself to a game, it's a good way to get people to stick with the training and finish it."

She thinks that although games can be used effectively in CBT, vendors of generic off-the-shelf courseware have been hesitant to present packages that might be interpreted as frivolous to training managers who are responsible for very large budgets.

As a result, these vendors go with straight, plain vanilla instruction, because it is easier for training managers to justify to management a CBT budget that does not look like it is filled with sophisticated games — regardless of student tastes.

Mambretti suggests that managers watch for the use of voice I/O and interactive videodisk technologies in CBT.

"Traditionally, training managers have stayed away from noisy CBT — that is, courses that play music or beep and honk — because it can be disturbing to other students in a classroom situation. But there is always the use of headphones, and this kind of option humanizes CBT," Mambretti says. She feels that voice I/O could cut back on the use of static page-turning techniques.

She also thinks that interactive videodisk technology and CBT technology are destined to play an important role in electronic learning design. "When the hardware becomes more affordable, CBT is going to become interactive videodisk. They are really the same thing. The programs that drive CBT are the same programs that drive interactive videodisk."

According to Mambretti, "When people can use videotape and videodisk interactively, a great deal of interest is going to grow in the medium because we are all children of the TV." And last, but not least, the "boring screen that people sometimes get in CBT will vanish." ■

Introducing
the remarkable new
COMPAQ PORTABLE II

Now there's a portable personal computer so small, so light, and so fast it defines a new industry standard. From the same company that set the standard—COMPAQ.®

The new advanced-technology COMPAQ PORTABLE II™ has all the advantages of the world's best-selling full-function portable—the original COMPAQ Portable—plus it's even more portable. And it's far more powerful than most desktop computers.

With its 80286 microprocessor, the COMPAQ PORTABLE II can run all the popular business software written for IBM® Personal Computers. At speeds *three to five times faster* than the COMPAQ Portable, IBM PC/XT,™ and other compatibles.

It's more computer in less space

Never before has a computer this small been capable of so much. Making the COMPAQ PORTABLE II 30% smaller and 17% lighter—with no reduction in monitor size and a big gain in functionality—was an engineering triumph. The result is a full-function, advanced technology personal computer that's easy to take on business trips or carry from desk to desk.

A computer for now and for the future

The COMPAQ PORTABLE II excels in compatibility. And because of its standard 360-Kbyte diskette drive format, your data diskettes will be fully interchangeable with other COMPAQ, IBM, and compatible personal computers.

Expandability? An optional 10-Megabyte fixed disk drive stores over 5000 pages of data; the optional 20-Megabyte fixed disk drive, twice that. RAM expands to 2.1 Megabytes without an expansion slot, and with one expansion slot RAM can expand to 4.1 Megabytes. Since interfaces for the most popular peripherals are already built in, the two expansion slots can be used for connecting your computer to others: add a modem, a networking board, or a board for communicating with your mainframe.

No compromises

The COMPAQ PORTABLE II puts tremendous computing potential within the grasp of every computer user. It's backed by the service and the support of over 2900 Authorized COMPAQ Computer Dealers worldwide. Plus, it's made by the undisputed world leader in portable personal computers. And for that title, there's no competition.

For the name of the dealer nearest you, call toll-free 1-800-231-0900 and ask for Operator 16. In Canada, call (416) 449-8741. In Europe, telex 84117898630AB; 898630 COMPAQ TTX D.

IBM® is a registered trademark and IBM PC/XT™ is a trademark of International Business Machines Corporation. ©1986 COMPAQ Computer Corporation. All rights reserved.

It simply works better.

COMPAQ
PORTABLE II™

Continued from page 56

beyond the walls of the bank's Philadelphia headquarters and into about 50 branch offices throughout the country. Derrickson knows the expansion will not work without a good deal of effort.

Exporting training always presents a challenge. Because most companies cannot afford the time and expense of shipping instructors from site to site, quality control becomes difficult.

To circumvent this problem, PSFS is considering a number of options:

- One plan is to enlist a system administrator at each bank to serve as a front-line trainer and liaison to the central information center. But the branches are too small to support a dedicated trainer, and Derrickson worries that training will get lost in the administrators' other responsibilities.
- Another possibility is to send trainers from corporate headquarters to the branch offices, but Derrickson views this option as a last resort.
- A third option is to export training via CBT courses, a move that would consume little of the information center's time.

Video provides yet another option for companies that want to export their training programs outside of corporate headquarters, according to Allridge of Manufacturers Hanover.

Manufacturers Hanover exports training to extremely remote sites, usually in response to pleas for assistance from trained employees who got shipped overseas. "Whether our users are in Singapore, Hong Kong or Bombay, they want to be able to use their own terminals to access our data," Allridge says.

Because the firm cannot justify the cost of shipping its instructors around the world, it sends videotapes of those instructors, which Allridge considers the next best thing. While video is not as interactive as instructor-led training, it does supply the personal contact of a human face and voice, both lacking from CBT.

CBT courses, however, are generally less expensive than video. Moreover, they provide the opportunity to track students' performance. Metro-North Commuter Railroad in New York plans to rely on the medium to export training to mainframe users in New Haven, Conn., and Harmon, N.Y.

The firm cannot possibly provide instructor-led training at the two installations, according to Phyllis Aniello, Metro-North's training director. "There's no facility to train in, and the cities are too far away and spread out," she notes. "Plus, there is a lot of turnover, which creates a constant demand for training."

The training the railroad exports will primarily teach data entry to people who input maintenance information, recording which parts of a train need repair and when. The railroad's information center is customizing its CBT courses so trainees will learn only what they need to know. Aniello plans to track performance by compiling reports that list students and their scores.

Every training manager needs to find ways to evaluate his program. If a training program is new, evaluations help it improve; if the program is mature, they demonstrate success and keep management happy. But it is hard to isolate training from other factors that affect productivity. Evaluations require a lot of time and money.

Student evaluation forms and qualification tests provide the most practical account of a training program's success, but the popularity of a course can serve as a barometer as well.

A manager can measure the success of mainframe training courses by auditing the way employees use the system. If underutilization shows up as a trend, the training center can offer a refresher course.

The real challenge, however, lies in getting trainees to apply their newfound knowledge to their daily work. "It's one thing to learn about a product and another thing to get it to work in your environment," Aniello observes. When scores of new users are comfortable and productive with their new tools, the training manager can rest assured that his staff has succeeded. ■

If you buy a TI 855 printer now, you won't have to upgrade to one later.

Don't tack just any printer on your new PC for now, thinking that you'll get what you really need later. Start with the best, a TI 855 or TI 865 printer. That way you can put the money you'd have spent on a needless upgrade on some other smart investment.

You see, our OMNI 800™ Model 855 is actually three printers in one. For word processing, it delivers letter-quality printing that rivals the best daisy wheel printers around. For data processing, it prints at 150 characters per second. And for your graphics, it reproduces screen or monitor images in the finest detail.

Of course, these advantages are all true of our TI 865 wide-carriage printer, too.

What's more, since our printers are among the easiest to use, you can utilize all the capabilities built into your PC and software right from the start. Instead of sometime later. You even have a choice of over 30 different plug-in type fonts, any three of which can be printed on the same page without ever stopping the printer! Just touch the control panel and it happens. Simple. So every document looks just the way you want it to. Professional.

As for reliability, TI printers are legendary. Just ask any major airline.

So don't downgrade your PC's performance with a printer you'll outgrow in a month. Get yourself a TI 855 or TI 865 printer now. It's easy. Just call 1-800-527-3500, ext. 801, for the TI Dealer near you.

TEXAS INSTRUMENTS

Creating useful products and services for you.

OMNI 800 is a trademark of Texas Instruments, Incorporated.

28227
©1985 TI

Guess who just won two record breaking contracts every software company would give its eye teeth for?

Enable.
Enable?
Enable.

On Monday, February 24, following a hotly contested 10-month competition, the IRS announced one of the largest integrated software/hardware contracts ever granted: 15,000 laptop computers, each one with Enable, from the Software Group.

Now, for the first time, every IRS field auditor will have laptop power to access home office mainframe data, search records, revise tax statements, and turn out final reports. On the spot.

On Friday, February 28, following what may be the most rigorous selection and testing process ever conducted, the U.S. Air Force awarded an even larger contract for microcomputer software and hardware. Again, the integrated software chosen was Enable.

Now, for the first time, The Air Force (*and* the Army *and* the Navy) will have a flexible, easy to learn, multifunction system that can be customized to handle an incredibly wide range of needs.

Enable is the only system available with functionality, comparable to the leading stand-alones in each module: word processing, spreadsheet, DBMS, graphics and telecommunications. All tightly integrated with common commands for easy transfer of data from file to file, desk to desk, office to office.

Further, thanks to Enable's menu generator, system-wide macros and procedural language, the entire system can be customized for non-technical users, giving them easy access to Enable's enormous capabilities without the heavy training usually required for such power.

All confirming a growing awareness among users in government and industry alike: there's integration, and then there's Enable integration.

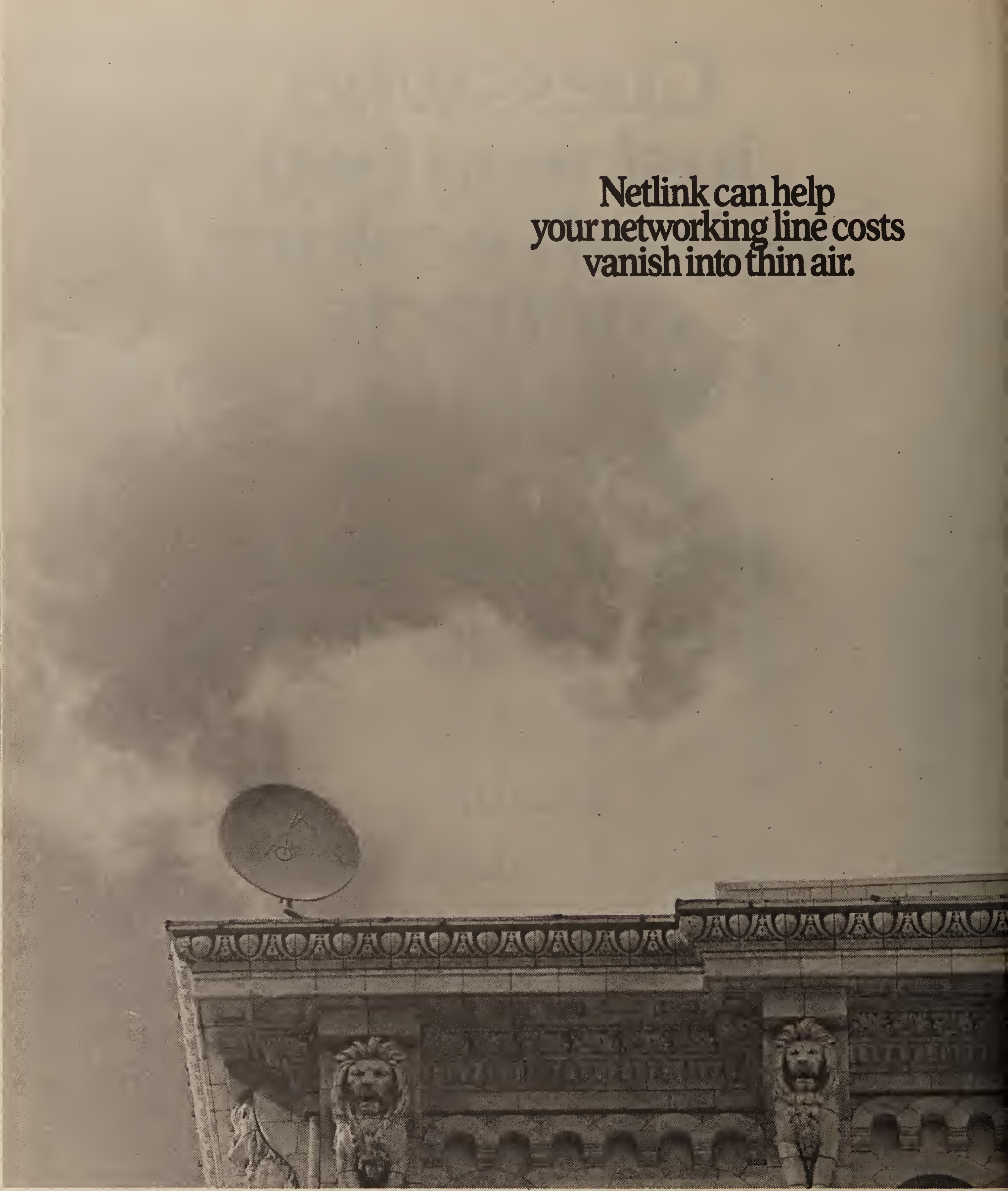
Efficient, effective, and hard at work for AT&T, Hughes Aircraft, Dow Corning and a host of other Fortune 1000 companies. In the U.S. and in eight other languages around the world.

As one department head remarked, "When people come in for a spreadsheet, we give 'em Enable. When they come in for a database, we give 'em Enable. Word processing. . .we give 'em Enable. I simply can't see us outgrowing Enable."

enable™
integration without compromise

1-800-634-3470 (In New York, 1-800-551-1004).

Call for more product information including a comparison of Enable's features vs. other leading multifunction and stand-alone packages; our $14.95 demo system; or the name of your nearest Enable dealer. The Software Group, Northway Ten Executive Park, Ballston Lake, New York 12019.



If you lease expensive telephone lines to link your data and voice communications throughout your company, it's time you made one more telephone call. The one to DCA.

We'll show you how you can link up your network through microwave, infrared, fiber or any other high-capacity transmissions. How in most cases you can have it up and running in less than a month and paying for itself within a year. And how easy it is to modify or expand your network without waiting around for the telephone company to finally get around to you.

It's called the Netlink,™ DCA's high-speed multiplexor.

And it can help you to reduce your telephone leased-line charges to a nice round number.

$0.

Find out more about Netlink or any of our networking products. Call 1-800-241-4762 (ext. 504), or write 1000 Alderman Drive,
Alpharetta,
Georgia 30201.

dca®
Digital Communications Associates, Inc.

Netlink is a trademark and DCA is a registered trademark of Digital Communications Associates, Inc. © 1986 Digital Communications Associates, Inc.

Upgrading proves cost-effective for immediate PC expansion

CW PHOTO BY P. CHARLES LADOUCEUR

The new AT clones tempt many users with claims of productivity increases. But upgrading installed PCs — via a broad range of upgrade options — can deliver superior compatibility and speed at much lower cost.

By T. A. ELKINS

Purchasing new IBM Personal Computer ATs or clones is one way for a company to update its personal computer equipment. This alternative yields a good degree of software compatibility, produces both real and perceived productivity increases — and expends a noteworthy amount of money. I believe that generally equal and sometimes superior compatibility and performance can be acquired at much lower cost by upgrading existing computers instead.

For one thing, the purchase-upgrade-replace sequence that many managers expect with the AT and its clones is not a likely pattern for the near future. Some history (of the Intel Corp. 80286 chip development) and some theory (about the Intel 80386) go a long way toward justifying this position.

A few naysayers will always argue against undertaking any changes to installed computers for reasons of expense or politics, but let's assume that the wide-ranging counterarguments and an appropriate management investigation have established the clear need for improvements in speed, power and efficiency. A less commonly recognized benefit is the double psychological return on investment achieved by upgrading personal computers: It prevents productive employees from feeling their work only rates outdated equipment, and it encourages these employees to believe their work is truly valued.

Unfortunately, there is no universal upgrade path, and several of the prospective paths are incompatible or wasteful if taken together. Still, much improvement can be achieved through the products marketed today.

An intrinsic side effect of upgrading existing equipment, however, will be to place new burdens upon the data processing department of the upgrading organization and to increase such organizations' necessary level of centralization.

Specific upgrades

Where cost/performance is the controlling parameter in an upgrade decision, several simple paths are available. First, in operations where in-house programs are most commonly run in interpreted Basic, truly enormous gains can come from a software upgrade: a switch to runtime programs generated by an optimizing compiler. These compilers are often fairly costly, but only one is normally needed for every IBM Personal Computer in use to demonstrate effective speed increases of a factor of eight to perhaps 15.

For some time, Microway, Inc. of Kingston, Mass., has offered a series of Basic compilers that produce fast and nearly optimum code. In published tests, Microway claims performance improvements consistent with those given above.

Where floating-point math is a major bottleneck and where compatible or modifiable software is used, an Intel 8087 math coprocessor can yield genuine speed increases of a factor of 10 to 30. In the most fortunate circumstances, where an optimizing compiler can be combined with 8087 math coprocessors, program execution times might be reduced from 600 or 700 seconds to 4 or 5 seconds. Hardware costs for this upgrade path run between $120 and $150 per computer, even without considering the inevitable commercial discounts. Costs for optimizing compilers should be well under $1,000.

Existing Personal Computer XTs can be made slightly more productive and much more convenient with the addition of a battery-backed clock/calendar like the Dclock by Microsync, Inc. of Carrollton, Texas. This product consists of a tiny clock daughterboard that holds an Intel 8088 chip and itself plugs into the 8088's socket, giving DOS an automatic time/date setting without the loss of a slot. As a major bonus, an appendix in the Dclock manual describes an easy plug-in method of extending the XT motherboard memory to the full 640K-byte DOS limit, which saves considerable cost and of course an expansion slot. (Unfortunately, this excellent daughterboard is

---

Professor Elkins is a scholar with an ongoing research interest in advanced data encryption systems. He does management consulting in strategy and policy matters.

not currently compatible with any of the processor replacement accelerator boards to be discussed.)

With full memory now reduced to a minor cost, it is reasonable and most productive to run XTs with disk-caching software. These programs, like Personal Computer Support Group's Lightning and Intelligent Research Ltd.'s Cache System, improve disk-access performance to an amazing degree. Not incidently, they reduce the demands on hard-disk read/write arms, perhaps extending hard-disk life expectancies. Some form of disk-caching software is highly recommended.

In conclusion, then, several low-level and inexpensive processor enhancements are commercially available. For example, the 8088 chip can be replaced with a NEC Corp. V20 for about $25. But in this case, the 8% to 15% improvement in throughput yields a poor effort/benefit payout. Unfortunately, a test of the NEC V30, the Intel 8086 replacement chip, was not possible before press time. Several replacement processors, also offering low cost but yielding low performance increases, offer one particular advantage (mentioned below) but seem unattractive in general for the demanding commercial-use environment.

> ❞
>
> *Where minimum system change is more important than initial expense, a plug-in hard-disk card may be desirable.*

Minimal system change

Beyond the minimum-expense additions, the IBM Personal Computer can profit most from a hard disk. In those circumstances where minimum system change is more important than initial expense, a plug-in hard-disk card may be desirable. This category of boards includes a hard disk along with its controller circuitry on the card. They need only one or 1½ expansion slots and retain both of the floppy disk drives the system usually has installed.

For example, the Hardcard from Plus Development Corp. of Milpitas, Calif., offers several advantages over hard disks. They include automatic parking, which protects the disk in the event of a nonstandard stop sequence; extremely high shock resistance, claimed to be 100Gs nonworking and 10Gs running — much higher values than most standard disks can boast; and a mean time between failures rated at 25,000 hours — more than double the industry norm.

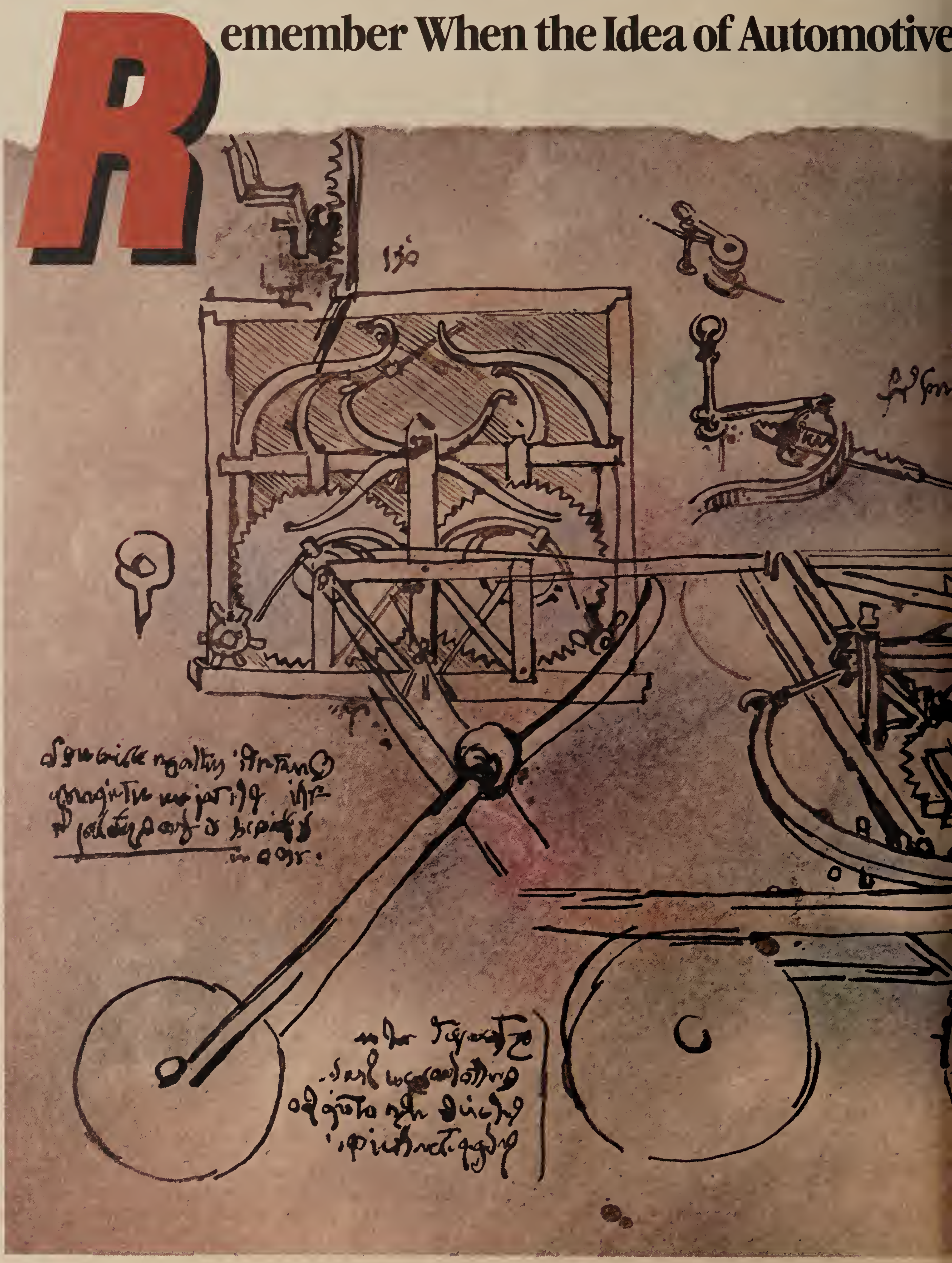
The Hardcard is advertised as completely IBM PC compatible, and when used with the appropriate read-only memory, is fully able to boot the system if desired. This latter property is most important if convenience of operation is to be maximized. Finally, the Hardcard is rated at only about 11W, leaving open the possibility of upgrading existing PCs without installing a new power supply — a mixed blessing but a real convenience.

Express Systems, Inc. of Schaumburg, Ill., offers two hard-disk cards of its own with claimed shock resistance of 50 to 60Gs stopped and 6 to 10Gs running, a mean time between failures rated at 14,000 hours and an excellent price. One of these cards is also self-parking; both have a 20M-byte capacity. The Express System card, among others, requires a 12V connection, which is not particularly a hardship but does complicate installation.

Of more consequence, none of these cards can coexist with another hard-disk controller. Either the card must be able to run existing disks, with the expected loss of all existing data, or any existing disk must be removed from the system. In systems with existing hard disks, check carefully for this limitation; be certain to specify any existing disks when ordering.

Where cost continues to be a factor and the loss of a floppy is not viewed with alarm, a number of suppliers can provide excellent add-on hard disks. Express Systems' array of disks and controllers seems fairly complete and is attractively priced. The firm actively promotes replacing PC power supplies when the system is expanded, although the firm claims its smaller disks have sufficiently low power requirements to work with a PC

Remember When the Idea of Automotive



that is not loaded. (In general, I recommend against a noncard internal hard disk without a PC power supply upgrade.) Express Systems also offers a dual-floppy/dual-hard-disk, single-slot disk controller to save a slot. There are many other suppliers of good hard-disk equipment as well.

A good rule for system upgrades, unless a warranty is still in effect, would require companies to add a new, low-noise, 130W power supply with the addition of any ordinary internal hard-disk controller. With retail prices for disk, controller and power supply of less than $500 now available, a PC upgrade to hard disk should get careful consideration.

Two logical drives

Two last hard-disk points: Some disk controllers, like the DTC-5150BX from Data Technology Corp. in Santa Clara, Calif., can split one physical hard disk into two logical disk drives. This feature is both convenient and useful. It offers protection for data on one part of the disk, designated as one drive, from runaway programs writing to another part of the disk with the other drive designation. Where other features seem about equal, I strongly recommend disk-splitting controllers. For systems with disks with more than the DOS limit of 32M bytes of capacity, a disk-splitting drive or a DOS driver are a necessity.

Unfortunately, the Data Technology unit's claimed "drive-to-drive" independence is open to some question, so again, obtain a demo unit and check your specific software before you buy. And at the other end of the spectrum, some disk systems now come with software to combine two physical drives into one large logical disk if this should be needed.

Finally, hard disks that require a DOS device driver were often incompatible with commonly used software in the past and still are sometimes. Further, they can be expected to remain incompatible with many disk-caching software programs. Care in selecting such systems is strongly recommended.

Glamour upgrades

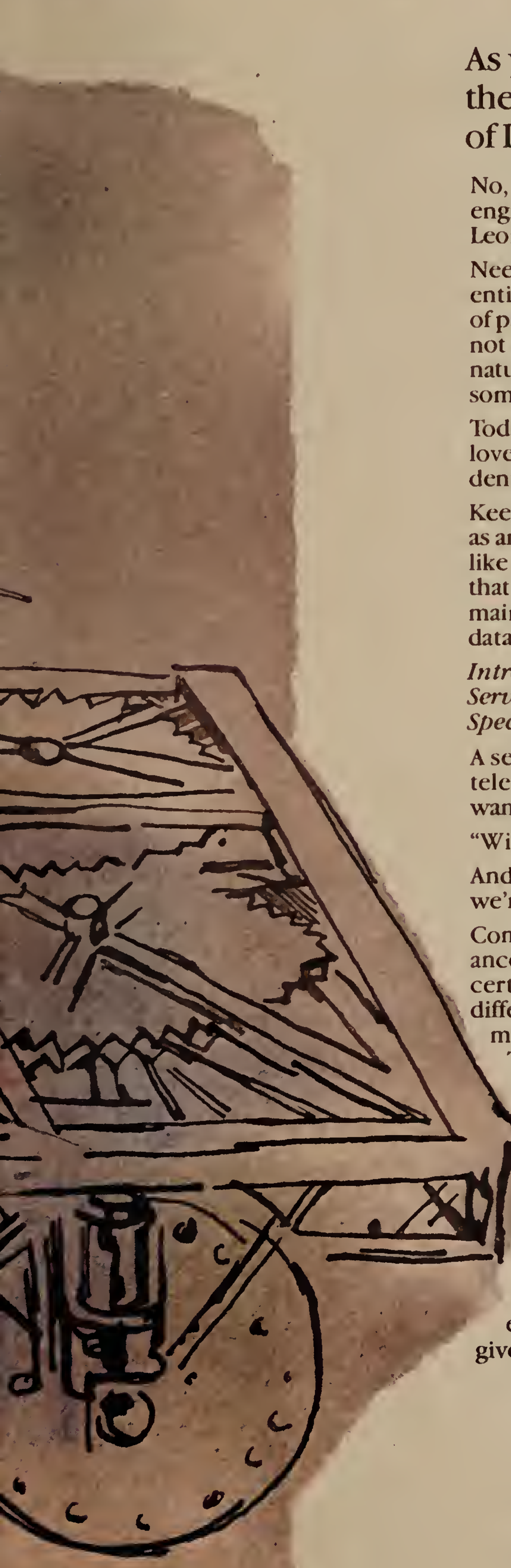
The glamour and payoff for upgrading Personal Computers and XTs come in the areas of memory and CPUs. There are currently three CPU upgrade paths I can recommend. A number of firms sell boards with a 9.54-MHz 8086 chip. The Persyst division of Emulex Corp., Costa Mesa, Calif., sells the Supercharger board. Univation, Inc. of Sunnyvale, Calif., sells the PC Turbocharger. Microway offers the original board, its Number Smasher. And naturally there are others. Each of these board designs incorporates a frequency doubler that increases the Personal Computer's clock from 4.77 MHz to 9.54 MHz. In addition, all carry at least 512K bytes of 16-bit bus memory on the board, and all offer an optional 9.54-MHz 8087 math coprocessor.

All of these products depend for their speed increases on two multiplicative factors. First, each board doubles the usual system clock, thereby effectively doubling the processor's throughput. Second, each board uses an 8086 2-byte-bus processor to replace the PC XT's single-byte-bus 8088 processor. With the processor speed doubled and with the bus bandwidth also doubled, these boards can realize a fourfold increase in a few system activities.

Because the math coprocessor only achieves a single doubling from the faster clock, the final board speed is an average of the two increases. Each of the boards listed can offer a realistic speed increase over a standard PC XT of between 150% and 180% (performance increase factors of 2.5 to 2.8). Additionally, these boards, even though dependent on the same chips and technology, offer considerable differences.

To keep costs down, the Persyst Supercharger includes only 512K bytes of memory on board — a potential shortcoming, since neither it nor any of the other boards offers much of a speed increase when working from ordinary system memory. Users will notice the speed benefits when the boards can use their own onboard memory. This limitation puts the Supercharger at a disadvantage in the moderately rare individual applications and increasingly common situations where there are multiple memory-resident applications, in which processing requires frequent access to memory

Transportation Couldn't Get Out of First Gear.



As you can see from the accompanying illustration, the differential transmission wasn't the brainchild of Detroit.

No, it was more like Italy. And the engineer was none other than Leonardo Da Vinci.

Needless to say, talking differential transmissions over a plate of pasta in the 15th century was not altogether fashionable and, naturally enough, was met with some skepticism.

Today, of course, the American love affair with the car is rather evident. We couldn't live without it.

Keeping in mind the automobile as an accepted fact of life, we'd like to introduce you to a service that will become a standard in maintaining complex voice and data communications systems.

Introducing Communications Service Assurance from PacTel Spectrum Services.

A service every MIS director and telecommunications manager wanted but refused to believe in.

"Wish list thinking," they said.

And wish list thinking is what we're offering.

Communications Service Assurance is a new concept, to be certain, and, just like Leonardo's differential transmission, will be met with its share of skepticism. That's OK. We're asking that you keep an open mind.

Communications Service Assurance represents a single source for problem detection, diagnosis and preventive monitoring, as well as expediting restoral of your corporate communications. It helps with expansion and alteration and gives you customized services.

Communications Service Assurance packages the comprehensive solution for improving your system performance. You're able to concentrate on strategic MIS responsibilities instead of playing catch-up and reacting to the hassle, headaches and hang-ups of day-to-day problems plaguing your system.

Communications Service Assurance can be applied to any equipment, any protocols, at any site.

It incorporates diagnostic hardware and software.

It delivers teams of experienced test engineers from diversified backgrounds.

It accesses a unique system inventory data base.

It involves an ongoing industry relations program.

Remember, this is a service. We sell no hardware, lease no lines and repair no equipment.

What we do sell is increased reliability, productivity, bottom line cost-effectiveness and any level of expertise available 24 hours a day (we never close).

We're a wish that's a reality. We're a service that will become as accepted and important as the automobile.

And, yes, we'll keep you rolling in the right direction.

For further information, please call 800-446-4321. Or you can write directly, PacTel Spectrum Services, 100 Pringle Avenue, Suite 750, Walnut Creek, CA 94596, attention N. Floyd, Marketing Director.

PAC TEL
Spectrum Services

A Pacific Telesis Company

See us at ICA Booth #1944

above 512K bytes.

Nonetheless, there is a circumstance in which less than full board memory offers advantages (see below), and the cost saving realized by Persyst could be passed on to big buyers in a nicely reduced initial cost. The Persyst board also comes with no bundled software except for fast and slow software switches that the customer must program — another potential cost saving.

The Persyst board uses an unusual (if not unique) three-position speed switch. In the up position, this switch forces full processor speed; in the down position, it forces slow speed; in the middle position, the computer's speed is software controlled. Most other boards have two-position switches, fast and slow, but these speeds are affected by software routines. Finally, the Persyst board uses a daughterboard that plugs into the 8086 socket and holds the 8086 and the 8087. The heat-producing 8087 rests in the upper position on this daughterboard, so overheating of either chip seems unlikely.

Memory up to 640K-byte DOS limit

Univation and Microway both offer 128K-byte daughterboards to bring their 2-byte-bus memories up to the 640K-byte DOS limit.

Univation offers several productivity programs on disk, including a random-access memory (RAM) disk, print spooling, fast and slow software switches, several test programs and the excellent disk cache from Intelligent Research.

Microway offers all of this sort of software (either the cache program is the same or someone is guilty of copyright violation in one of the handbooks) and has a number of further test programs of considerable value.

Regrettably, the Univation board contains or can quickly develop a flaw when it accesses disks. With Satellite Software International's Word Perfect 4.1, it would not save a file, except as trash, unless the cache program was active. The board also had problems running Softlogic Solutions, Inc. Disk Optimizer, a program that organizes files on a disk such that physical and logical locations are consistent and file access is as fast as possible. The Turbocharger trashed a 10.5M-byte hard drive all the way back to the DOS format command Fdisk.

Technical support people at a Univation dealer and at Univation itself are aware of the problem, but I cannot recommend the present Univation Turbocharger.

Although the Turbocharger proved a fine product in the other respects I tested, without a firm fix for this direct memory access trouble, I cannot recommend the present model. I also fear that the 8087 is badly placed to avoid overheating problems with this board.

Smashing

Microway's established reputation in this field precedes it, but as it happened, I did have a small problem with its board. The Number Smasher has a metal end-plate that was incorrectly positioned, making the board too long to fit into the PC XT. Were the board mine, I would just bend the plate's support arms — I did try this a bit, but the distance to correct was several thirty-seconds of an inch, and a bit of bending was not enough.

I ran a quick and necessarily limited check on the board without its end-plate and it performed perfectly. Microway's board has both processor chips mounted vertically in special sockets that form two small chimneys. It is quite clear that they have devoted considerable attention to the rather important cooling issues.

> ”
>
> ***With retail prices for disk, controller and power supply of less than $500 now available, a PC upgrade to hard disk should get careful consideration.***

Of the four boards of this kind I tested, the Persyst offering seemed to have a tiny edge (a fraction of a second) in the system memory test, while the Microway board might have been an eighth of a second faster in the multiplication benchmark test. I recommend either, with the individual choice depending on the cost difference and the value to the customer of the fine Microway software and extra memory option. I do recommend that the cost of a site license for a good cache program, if one is not otherwise available, be included when considering the Persyst board. It would be silly to omit this aid.

The second accelerator type includes the Tiny Turbo by Orchid Technology of Fremont, Calif., and the Speedpac 286 from Victor Technologies, Inc. of Scotts Valley, Calif., among others. (The Victor board is available under several names.) These half-slot cards include an 8-MHz 80286 with an optional Intel 80287 and an 8K-byte, 16-bit-wide hardware memory cache. The 80286-based products are a bit less compatible with the existing software base than are the 8086-based systems, but I found no business software that they would not run.

These boards, using their 80286s, will generally not do an interweave or low-level format, for example. I am strongly opposed to software protection for line business production programs and did not test protected programs (except for Disk Optimizer) with any accelerator system. I would expect some difficulties with

LOOKING FOR THE BEST
VALUE IN PC/AT COMPATIBLES?

INTRODUCING THE $1495 A★STAR™

Looking for a lower priced, higher quality PC/AT compatible than our new A★Star™ is like looking for a needle in a haystack. You're more apt to come up with a case of hayfever.

A★Star gives you features you won't get from *any* other vendor. Not IBM. Not Compaq. Not even those foreign manufacturers. Features like a 220 watt power supply, eight *available* expansion slots and "network ready" multi-user operation. All for only $1495. And that price includes a 1.2MB diskette drive, 512KB memory, a fixed disk/diskette drive controller, a tactile feedback keyboard (you'll love it!) and a 6/8MHz switch/software selectable 80286 CPU.

Best of all, A★Star is quality built right here in America by Wells American Corporation - an American Stock Exchange manufacturer. So now you can buy with confidence from a vendor you can trust, just like you've trusted IBM. And you'll get a genuine, top quality product (not a cheap imitation) for a price even less than those "questionable" mail order clones. And if that's not enough, it's all money-back guaranteed!

The $1495 Wells American A★Star.™

A PC/AT FOR ONLY $1495?
THAT'S NOTHING TO SNEEZE AT!

(Hurry! This offer *is* limited.)

☐ I'm tired of sneezing! Have someone call me immediately to take my order.

☐ A★Star sounds terrific. Tell me more.

Name:__________
Company:__________
Phone:__________
Address:__________
City:__________
State:__________ Zip:______

Wells American
803/796-7800•TWX 510-601-2645
Sunset Boulevard • West Columbia, SC 29169

IBM. Personal Computer AT and AT are trademarks of International Business Machines Corporation.

Breaking away from the pack requires confidence, momentum and a keen sense of timing.

Concurrent
Computer Corporation

Advertisement Advertisement

SYSTEM 2000® DBMS Drives Industry with $12,000 License

SAS Institute Inc. establishes SYSTEM 2000 Data Base Management System at the forefront of cost-saving productivity tools with its $12,000 first-year licensing plan. The system includes: an integrated data dictionary, on-line query/update, a report generator, relational data base access, programming language interfaces, high-quality training and technical support, and more.

In addition, users can now link SYSTEM 2000 DBMS with the SAS® System of software to build data bases, store and retrieve data, merge and manipulate data, perform analyses, and produce reports and presentation graphics. Even Information Center users can gain access to SYSTEM 2000 DBMS through easy-to-use SAS menus.

To learn more about the most economical data base management system in the industry, write or call the SYSTEM 2000 Sales Department at SAS Institute Inc., Box 8000, SAS Circle, Cary, NC 27511-8000. Telephone (919) 467-8000. Telex 802505.

SAS and SYSTEM 2000 are registered trademarks of SAS Institute Inc., Cary, NC, USA.
Copyright © 1986 by SAS Institute Inc. Printed in the USA.

In Depth/PC Upgrades

certain protection techniques.

The Orchid board has a sizable advantage over the competing boards that I know about in that it retains the original system's 8088 chip and can switch back to it at any time. This feature should provide nearly complete software compatibility, albeit with the loss of the board's performance advantage when the 8088 is active.

The Victor board has a considerable advantage of its own in that it has a jumper that can disable the on-board 8K-byte cache, increasing the board's compatibility. Disabling the cache costs dearly in lost performance, although the throughput should still be perhaps twice the original system's level and twice the level Orchid achieves when its board is switched to the 8088 mode. But while the disabled cache should substantially increase the Victor board's compatibility with general software, it would be unrealistic to expect it to equal the capability of the Orchid board in 8088 mode.

These half-slot accelerators with only cache memory offer a potential advantage in that they are surprisingly fast and they use very little power — a matter of importance in a PC without an enlarged power supply. In a very cost-conscious organization, the Victor price advantage (about $100 at retail) might outweigh the greater general software compatibility of the Orchid. But for a large organization where compatibility surfaces as the primary concern, I would expect the Tiny Turbo's extreme compatibility to earn the more common nod.

Some half-slot cards like the ones described may be available without the on-board cache memory. These boards would be significantly slower than the cards mentioned and are recommended only when they have a great cost advantage and when certain multitasking software is to be run.

Full-memory processors

The last CPU product type to be reviewed concerns the full-memory 80286 coprocessors such as Orchid's PCturbo 286E and the Pfaster286 from Phoenix Computer Products Corp. in Norwood, Mass. Both of these boards, along with others in their class, use 8-MHz 80286 processors with between 1M and 2M bytes of 16-bit-bus memory without wait states on the card. Both of these boards offer optional 80287 math coprocessors. With the intrinsically fast 80286 processors operating at 8 MHz and using a 2-byte-wide memory bus, these boards blaze!

Literature from both Phoenix and Orchid show the Pfaster286 to be about equal in speed to the PCturbo 286E. Using public information, I would expect Phoenix's board to be a good product with one particularly nice feature — it can hold two full megabytes of memory on board without a daughtercard.

The Orchid card is a truly wonderful product. Besides impressive speed at an attractive price, this board offers some striking screen updates. It would be overly dramatic to say that the first time I saw it work I thought the computer had blown up, but the fact is that the first time I watched this board perform, I thought for a fraction of a second that something inside the monitor had let go; it is truly that fast. If your need in a PC is speed, look into this Orchid board.

As is becoming common, the software for this board is transferred to hard disk or boot disk by a user-friendly install program. I hate these programs because they never do things my way, but I grudgingly admit that the Orchid install program is not just friendly, it's obsequious. I mean to coin a new term of acceptability here. This program says in plain language just what it is about and then reviews just what it has done.

These products offer some direct, concurrent operation. For example, both boards retain the original 8088 to maintain complete software compatibility. Orchid uses this chip to run a disk cache program, a RAM disk and/or a print spooler while the 80286 is doing something entirely separate. Several boards installed in

How to handle applications development alligators

Our special seminar shows you how

You may have heard some form of the saying, "When you're up to your gluteus maximus in alligators, it's hard to remember you started out to drain the swamp."

If that's beginning to sound uncomfortably like your job description, and you're responsible for applications development, we have something to help: The CGI special seminar, "Managing the Full Life Cycle for Application Productivity."

You'll learn a comprehensive way to snatch your applications development operations from the jaws of paralysis. It's PACBASE™, CGI's unique dictionary-driven software system that can swiftly streamline your applications development and dramatically cut maintenance costs. By managing your full life cycle PACBASE™ will pay you dividends of greatly increased productivity and better control of your company's corporate data and related processes. And you'll hear how over 450 companies world wide have benefited from this system.

"Managing the Full Life Cycle" is specifically designed for vp's/directors of MIS and managers of applications development. The sessions last half a day, and they're FREE. Naturally, space is limited. To be sure of a reservation, why not take a moment to fill out and send in the coupon now? (For even faster service, call Linda Rose, Seminar Manager at (914) 735-5030 collect.)

cgi
CGI Systems, Inc.
One Blue Hill Plaza, P.O. Box 1645
Pearl River, NY 10965

1986
SPRING SEMINAR PROGRAM

5/6/86	Hartford	Hartford Marriott Farmington
5/7/86	Boston	Boston Marriott-Copley Place
5/8/86	New York	The Westbury
5/8/86	Orlando	Orlando Marriott
5/9/86	New Jersey	Saddle Brook Marriott
5/13/86	Los Angeles	The Westin Bonaventure
5/14/86	San Diego	Hotel Inter-Continental San Diego
5/15/86	San Francisco	Hyatt on Union Square
5/16/86	Seattle	Hyatt Seattle at Seattle-Tacoma International Airport
5/21/86	Oak Brook	Hyatt Oak Brook
5/22/86	St. Paul	The Saint Paul Hotel
5/23/86	Dearborn	Hyatt Regency Dearborn at Fairlane Town Center
5/28/86	Chicago	Hyatt Regency in Illinois Center
5/28/86	Dallas	Loews Anatole Dallas
5/29/86	Salt Lake City	The Westin Hotel Utah
5/29/86	Denver	Sheraton Denver Airport
6/3/86	Arlington	Twin Bridges Marriott
6/4/86	Baltimore	Sheraton Inner Harbor Hotel
6/5/86	Atlanta	Hyatt Regency in Peachtree Center
6/10/86	Columbus	Hyatt Regency Columbus at Ohio Center
6/11/86	Indianapolis	Hyatt Regency at State Capitol
6/12/86	Philadelphia	Hilton of Philadelphia
6/13/86	Milwaukee	The Marc Plaza Hotel

Help me get the alligators off my back.

☐ I and _____ (number) of my associates would like to attend the ________ (date) seminar in ____________ (location).

☐ I cannot attend but would like more information.

Name ________
Title ________
Company ________
Street ________
City ____ State ____ Zip ____
Phone ________

We're making our move with an emerging technology and over $260 million in sales.

We're Concurrent Computer Corporation.

Concurrent
Computer Corporation

A new computer company that's a born winner. Experienced, formidable, innovative. Making a move you'll find impossible to ignore.

Concurrent Computer Corporation. The logical evolution of the Perkin-Elmer Data Systems Group, with over a decade of experience in high performance, high reliability 32-bit superminicomputers. A track record of profitability and solid sales growth. A worldwide presence with worldwide support.

Plus a commitment to parallel processing technology that's so complete, we named our new company for it.

We don't just talk about parallel processing. We're already doing it, with over 300 installations up and running in both technical and commercial applications. In fact, Concurrent Computer Corporation has delivered over 55% of all the parallel processing solutions operating today.

And that's only the beginning. Now watch us make our move.

Concurrent
Computer Corporation

We've poured on Parall
that leave Uniproc

In the high performance race for computing power, uniprocessing doesn't stand a chance. Not against Concurrent Computer Corporation's innovative, proven parallel processing concepts.

How parallelism works.

Every large application is made up of many interdependent tasks. A uniprocessing serial approach would execute them one at a time. Instead, we divide them into related segments, and distribute them to multiple real-time processors.

Some handle I/O or transaction processing. Others execute number crunching or maintain a database. But all work concurrently. And far more efficiently.

The advantages are clear. Computing performance is maximized, with dramatic increases in speed and throughput. No more I/O bottlenecks. The use of multiple processors provides inherent built-in availability. And a high degree of configuration flexibility. At a minimal cost.

el Processing Solutions
essing in the dust.

nlimited potential. Unlimited growth.

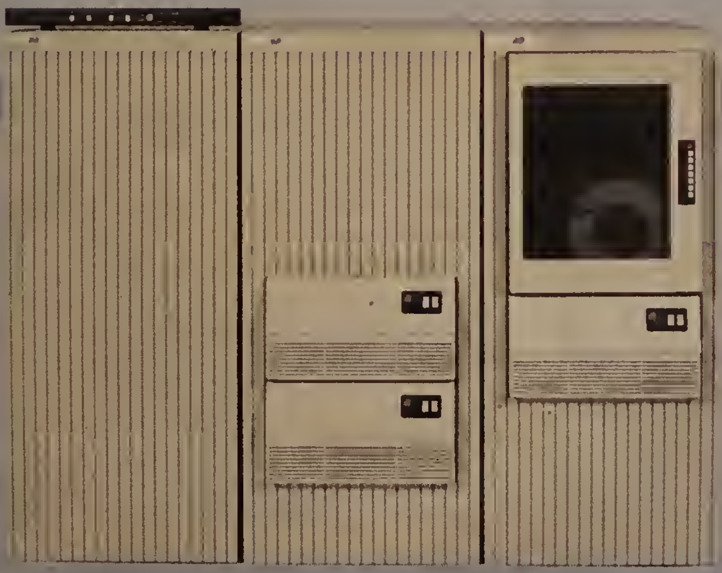
With a single machine, you're
lways bound by limitations. Either
ou're overcompensating, or you're
ompromising. But with our unique
arallel processing solutions, you
et just the computing power and
peed you need. No more. No less.

If your present computing appli-
ation demands uniprocessing, you
an begin with our uniprocessors
nd then upgrade to parallel pro-
essing later on. And Concurrent
omputer Corporation can let you
nake this transition easily.

When you're ready for expansion, you can plug in auxiliary processors with minimal redundancy. And without software changes. So you grow at your own pace. Incrementally. And very economically.

Not just in the low cost of adding additional processors. Not just in software protection. But in every aspect of your installation, from overhead to footprint to operating costs.

The race is on. And it looks like Concurrent Computer Corporation is about to take the lead.



Concurrent
Computer Corporation

the same computer are able, the vendor claims, to run different copies of DOS and different application programs concurrently, although I did not test this feature.

Unturbo

Orchid includes a disk cache program with the PCturbo 286E that offers two valuable advantages compared with other such programs I have examined. First, it is easily removed from memory when necessary, an ability none of the other cache programs I have seen share and a useful feature when copying programs needing verification.

Second, this disk cache program may be loaded into DOS memory, expanded memory or protected memory, when the latter two are available, at the user's option. With 1.2M bytes of disk cache, my system needs to do very few disk reads indeed. Unfortunately, this cache is not recommended with floppies, which is where the Intelligent Research cache really shines. A new version of the Intelligent Research cache can run in expanded memory, which makes it especially attractive in its own way. But take note — with some cache programs, particularly if floppies are cached, the verify program with the DOS copy function may be compromised. Unloading the cache or disabling it when copying important new software is a good idea.

> ”
>
> ***The first time I watched this board perform, I thought for a fraction of a second that something inside the monitor had let go; it is truly that fast.***

When the original system is needed with these boards, the command Unturbo or some equivalent returns users to DOS and the original 8088. The board loads its own copy of DOS, clean of any customized features. In this mode, the micro can run any program it had run originally, but without the accelerator's enormous speed, which I emphasize is addictive. The board's high-speed compatibility is slightly less precise than the half-slot units just discussed.

These systems are so advanced that they will violate some of the pickier software license agreements specifying single CPUs, a not insignificant concern for DP managers.

Classic Technology of San Jose, Calif., offers its 286 Speed Pak, a board that is much like the ones just discussed but that has a wait state for its memory. This board would accordingly run slower with onboard processing than the Orchid or Phoenix products. On the other hand, Classic claims to have a special BIOS implemented that accelerates disk I/O, and the company advertises a very high degree of software compatibility.

For speed demons

Once a user becomes accustomed to these boards' remarkable speeds, they do not really offer him anything more. In fact, doing nothing but increasing speed is the major design goal of these products. Except where concurrent processing is possible, compatibility with existing software and speed are the properties you pay for when you buy one of these boards.

Naturally the question must arise: Is speed enough to justify the cost? From my own experience I can answer with a rather emphatic yes. Programs like Word Perfect 4.1 too often are a bit more sophisticated and demand a bit more power than the PC environment supplies. With any of these accelerator boards, the Word Perfect screen scrolls as fast as scroll commands enter the input buffer. The system "beep" at buffer full is never heard, as it is all too frequently with a 4.77-MHz 8088. Computational programs process so much faster that I check (that is, rerun) jobs I would just accept as correct with an ordinary PC.

Several firms offer replacement motherboards that should show a nice improvement in speed, and there are at least two non-Intel coprocessor boards on the market with very fast floating-point performance figures.

Expanding memory

Memory beyond what is on the motherboard comes in three varieties. Conventional memory expansion boards are obsolete and not really recommended. The first step beyond conventional expansion lies in products like Maxit, a 256K-byte board from McGraw-Hill CCIG Software of Dallas. This board can add one or more segments to DOS, raising the system applications' limit to 704K bytes or more. In addition, it can switch-select unused space in the upper address range of the 8088 or 8086 (provided IBM's Enhanced Graphics Adapter [EGA] or other controllers have not preempted it all) yielding up to 256K bytes for memory-resident programs like Borland International, Inc.'s Sidekick, Central Point Software, Inc. PC Tools, and various vendors' Ramdisk and disk cache.

Special software can force certain of these programs into this otherwise wasted memory address range even when they are not designed to use it, leaving DOS free for applications — just as is most desirable. This board will be the answer to the prayers of a great many memory-resident program lovers and offers anyone not using expanded memory some real benefits.

The Lotus/Intel/Microsoft

MULTIPLE CPU SHOPS...

Win the Shared Device Management Game and Gain a More Productive Environment

Objective
To effectively manage the sharing of tape drives, DASD and consoles for a more productive MVS and MVS/XA operating environment.

Shared Device Management Rules
Pick a company with proven stability, excellent world-wide support and timely product upgrades and enhancements.

Strategy
Include one or all three of the following Shared Device Management products:

- STAM
(Shared Tape Allocation Manager)
Automatically controls the allocation of shared tape devices.
- SDSI Plus
(Shared Dataset Integrity Plus)
Allows the sharing of datasets and the simultaneous access of the same data.
- SCON
(Superconsole)
Provides a single console image for multiple system environments.

To Win Contact:
Duquesne Systems
Two Allegheny Center
Pittsburgh, PA 15212
(800) 323-2600
In PA (412) 323-2600

"Duquesne Systems is committed to continue to develop and support shared CPU products and remain the leaders in multiple CPU software."

Now is the time to make your move.

Pictured above is Rory O'Reilly, current world record holder in the flying 500 Meter and flying 1000 Meter sprints.

Concurrent Computer Corporation is confident that the future of computing lies in parallel processing technology.

And we think it's only a matter of time before you come to the same conclusion. There is a steadily increasing demand for number crunching power and newer, more sophisticated applications in real-time and real-time transaction processing. Today, every computer installation experiencing growth can take advantage of parallel processing.

But timing is crucial. The sooner you make the move to parallel processing, the sooner you'll reap the benefits. Wait until later, and the high cost of conversion may cause you some regrets.

There's one company that can take you into tomorrow with a powerful parallel processing solution today. Concurrent Computer Corporation. With proven technology. Available product. And solid support.

So follow our lead and break away from the pack. Sooner or later you'll be using a parallel processing solution. And sooner is clearly better.

To get the full story, mail the coupon. Or call toll-free: **1-800-631-2154.**

Concurrent
Computer Corporation

I want to lead the pack with Parallel Processing.

Name______________________________

Title______________________________

Company____________________________

Address____________________________

City_______________State_____Zip_____

Phone (____)________________________

Mail to: Concurrent Computer Corporation,
Two Crescent Place, Oceanport,
New Jersey 07757

CW050586

Expanded Memory Specification (EMS) changed the rules of the game where memory is concerned. It also, a bit more than incidently, introduced some of the worst and most confusing terminology imaginable into a discipline that does not need further confusion.

As a mnemonic — which you will most likely need — it is a good idea to associate ex*pa*nded and *pa*ged with one another. Under the control of special programs that can use its device drivers, an EMS system pages blocks of memory larger than the 8088 and 8086 address capability — 1M byte — into this accessible range. And just to add to the fun, there is an Enhanced Expanded Memory Specification from AST/Quadram/Ashton-Tate that uses a superset of the Lotus/Intel/Microsoft specification. If this is beginning to sound like more than you really want to know about memory, skim the next paragraph.

In operation, the EMS deals in 16K-byte pages, which it switches up and down in memory from the accessible range to above it and back down into it. In the Lotus/Intel/Microsoft version, these pages are all moved through a 64K-byte window or frame located above the 640K-byte DOS limit. The AST/Quadram/Ashton-Tate version moves the pages in a much freer manner through all available even-boundary 16K-byte windows in high memory and, under the control of certain programs with certain hardware setups, through DOS memory as well.

In addition to these capabilities, a second type of device driver allows programs written to use the ex*te*nded memory of an AT, not otherwise available on PCs, to run in ex*pa*nded memory. You might try associating ex*te*nded memory with *te*n twenty-four kilobytes (1,024K bytes), the address limit of the 8088 and 8086. The AST/Quadram/Ashton-Tate standard with 64 page registers is clearly superior to the Lotus/Intel/Microsoft standard of only four, but Intel makes the chips and Microsoft Corp. writes both DOS and Windows. How much hope can be held out for the new version's success on the basis of mere technical advantage?

Using more memory

So much for confusing nomenclature. In operation, an EMS board adds a few dozen seconds to the boot process as it checks itself. One or more of these boards then allows specially written programs to run in up to 8M bytes of space at 1M to 2M bytes per board. There is a four-board limit at present.

Ready, an outline processor from Living Videotext, Inc. in Mountain View, Calif., is one of the earlier programs to use the expanded memory space. Normally, this memory-resident program uses 128K bytes of DOS memory. However, if it finds an acceptable expanded memory board, it uses only 4K bytes of applications memory — the remainder of the program is stored in expanded memory. The load process is a good bit slower when expanded memory is used, and Ready's response is further slowed. But both effects are mentioned in the documentation, and for memory-resident programs neither of these two limitations is of any great importance, while the savings to DOS memory can be most important indeed.

> ”
>
> ***Is speed enough to justify the cost? From my own experience I can answer with a rather emphatic yes.***

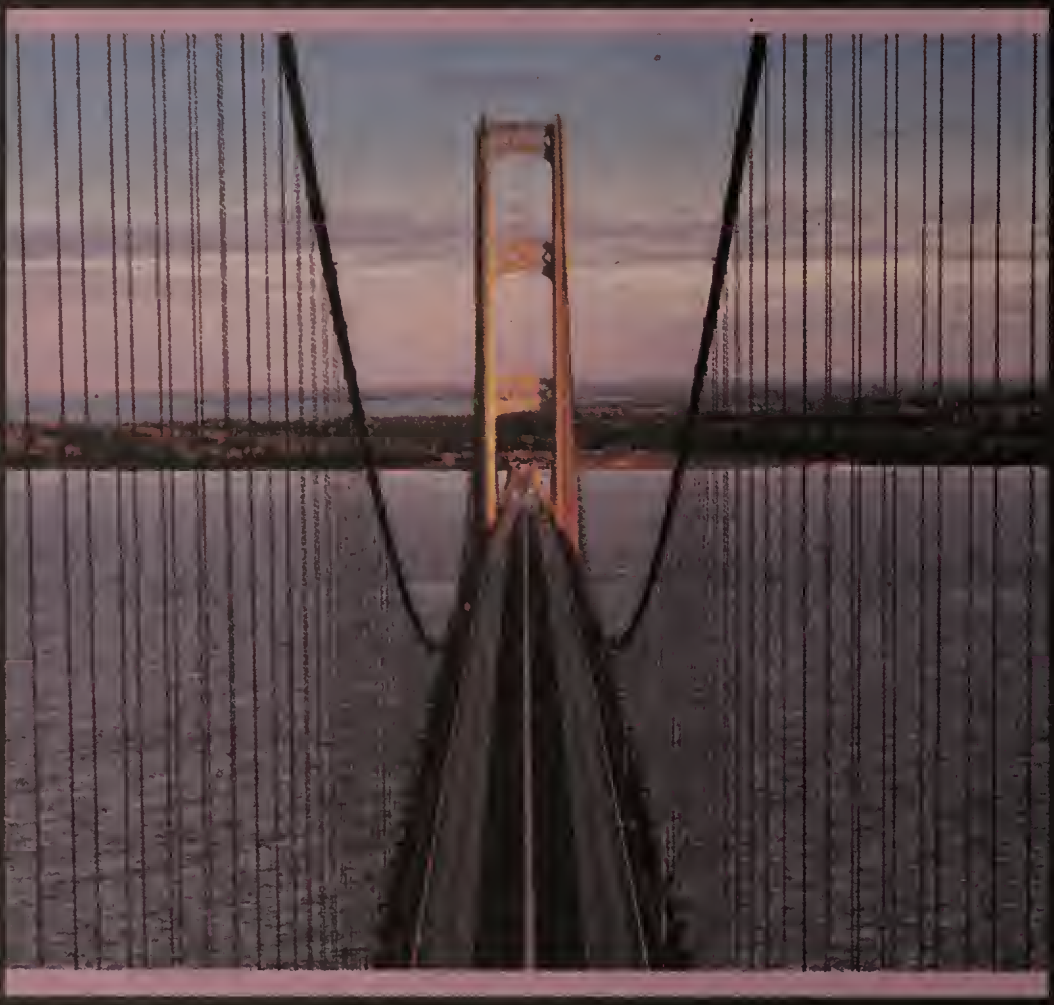
Orchid's cache program will also go into expanded memory, and running a 1.2M-byte cache, as I usually do, is a joy not to be dismissed lightly.

Even when switching between three or four application programs, one disk access for each is almost always enough. When I return to a program I ran a little while before, there it is in the cache.

Microway's cache will go into expanded memory as was mentioned; unfortunately, it interferes with my hard-disk park routine, while offering only 960K bytes of storage, and is consequently less useful. With floppies, Microway's cache would be the hands-down winner.

Generally, I would say

What gives
Series/1 EDX users
a secure bridge
to the future?



CMI SERIX/C

A "C" Compiler for EDX

If you are a satisfied EDX user and have concerns about changing technology and protecting your EDX software investment, the Serix/C compiler can provide you with a secure bridge to the future.

Serix/C is an intelligent choice because you can write new applications in C and run them under the EDX operating system while continuing to run your EDL programs. You can even run programs written in mixed C and EDL.

C offers advantages which make switching languages a cost-effective consideration.

Portability	You'll be able to migrate your software to new hardware environments.
Productivity	C is flexible enough to replace assembly language, so you can do most of your work in a high level language.
Performance	Serix/C has been designed to complement EDL and to take advantage of the rich Series/1 instruction set.

Now there is an intelligent alternative for Series/1 EDX users from CMI, the experts in buying, selling, and leasing new and used IBM data processing and AT&T telecommunications equipment.

CMI
A Torchmark Company

CMI Corporation
Software Marketing, 2600 Telegraph, P.O. Box 2026, Bloomfield Hills, MI 48303-2026
(313) 456-0000/TWX: 810-232-1667

Serix/C is a trademark of CMI Corporation; Series/1 and EDX are products of IBM Corporation; IBM is a registered trademark of IBM Corporation.

that these boards are currently worth their price and that their convenience and utility will grow quickly over time. Programs written to make use of their abilities are constantly being released.

Variety of memory

Again, there is a surprising difference between the available boards in this EMS category. Microway's Megapage holds up to 2M bytes of CMOS memory chips and offers low power usage. It comes bundled with the expanded memory version of the good Intelligent Research cache program. A bit surprising, however, is that Ready failed to load into expanded memory with this board. The cause of this problem could have been some action of mine — the test was necessarily short — or I suppose that a small driver difference might have introduced an incompatibility. But a clear lesson can be found here: Confirm compatibility between hardware and software before you commit to an expansion memory board.

Of perhaps more concern, when I was testing this board, the file allocation table on my E hard drive was destroyed, killing it back through Fdisk and beyond. For obvious reasons, I was reluctant to try to recreate this problem, but one possible cause of the problem occurred to me. Two attempts had been made to load a hard Ramdisk (H-Ramdisk) into extended memory on this board. If an H-Ramdisk utility failed to recognize an E drive and wrote to the file allocation tables of both the H-Ramdisk and the E drive, the observed results could easily have occurred. Another matter for careful checking in each installation. (Note: This problem was not caused by Microway's Megapage.)

Intel offers two Lotus/Intel/Microsoft extended memory boards. Its Above Board PC contains up to 2M bytes of memory. Above Board PS has a maximum of only 1.5M bytes of memory but includes a clock and two ports — much like the well-known AST Research, Inc. Six Pack. These boards must be viewed as the industry standard, and compatibility problems should be minimal.

Orchid offers two boards as well. The full-size Conquest comes with 1M byte of memory on board, a 1M-byte optional daughterboard and a networking daughterboard as an additional option. The Orchid Cramram uses special chip carriers to provide 2M bytes of pure memory in a half-slot space drawing less than 4.5W. Of importance to some, Orchid's boards are switchless and install with software that tests the current personal computer configuration, asks a few questions and does all the calculations needed to set up the boards in operation.

These boards also come with Orchid's fine expanded memory disk cache program. All of these manufacturers' boards come with Ramdisk and print spooler utilities. Note my previous caution here, however, about loading H-Ramdisks.

The AST Rampage board has a 2M-byte capacity on board, and a daughtercard can add a clock and two ports without the loss of other expansion space. It naturally conforms to the AST/Quadram/Ashton-Tate Enhanced EMS and runs Ready perfectly well. The extra value of the AST/Quadram/Ashton-Tate specification is hard to measure, but one matter will arise shortly. As is

Emulation optimizes desktop computing

By R. C. FISHER

Terminal emulator — *something that emulates (or strives to imitate, equal or outdistance) a terminal or any device by which data can enter or leave a communications network.*

Question: Why take an intelligent, powerful, IBM Personal Computer-compatible machine and ask it to act like a stupid terminal? Answer: increased efficiency.

What if you could train your average idiotic CRT to behave like a microprocessor? That is the kind of transformation possible if one uses a PC terminal emulator in place of a traditional VDT. The PC acts like a terminal during interactive hours and otherwise performs independently as a fully functioning microprocessor. As the dropping cost of baseline Personal Computer machines infiltrates the realm of CRT prices, a PC purchase will yield more computing power per square foot of office space.

Thus, terminal emulators optimize the use of the most valuable form of corporate real estate: the desktops of the professionals and executives who use them.

Emulator features

Terminal emulators are software products that tie a stand-alone microprocessor into a central data base by making the microprocessor act like an interactive VDT.

The first characteristic of any emulator belongs to the terminal that the product is trying to mimic. Emulations of the IBM 3270 series terminal and the very popular Digital Equipment Corp. VT100 class are the most common. Thus, prevalent computer jargon speaks of a VT100 emulator package. Once the role model has been chosen, a microcomputer running the emulator software — with many features that can be tailored to individual needs — can often do a better job working with the user than the terminal being impersonated can.

Because an emulator has the advantage of a smart CPU sitting between the user's CRT and the host computer, keyboard characters may be translated by the PC into specific user-defined sequences, which are then sent to the host.

For example, a user might instruct his Personal Computer CPU to translate the typed input sequence CTRL P into a Purge command, sent to the host to purge all multiple versions of data residing in his file directory. Much like a simple math function, the keyboard input CTRL P results in an output of Purge * — purge all. This process of redefining keystrokes is known as keyboard programmability.

Vterm II from Coefficient Systems Corp. is a VT100 emulator designed to run on IBM PC-compatible equipment. It allows users to redefine all but two of the Personal Computer function keys. When used with the control character and shift key, this ability establishes 28 local commands that can be programmed into one key. This command power is available without using any resources of the host CPU. Clearly, the workstation has become more productive without taxing the entire DP network.

Zenith Data Systems Corp.'s Zstem PC is another VT100 emulator. Zstem gives the user the ability to redefine almost the entire keyboard. Thus, in ASCII, if the host recognizes the Backspace character rather than the Delete character as the rub-out command, this will allow the Delete key to be redefined locally in the emulator. Although the letters will rarely be redefined because they are essential to meaningful communication, the keyboard, in combination with the control character, will give more than 60 reprogramming options.

Because the emulator itself must be loaded before the Personal Computer can act like a terminal, keyboard programmability allows users to tailor the hardware they use to their specific needs. For example, Tessy, from ID Systems Corp., provides a highly friendly menu function to define its alphanumeric keys as well as its control characters.

Many emulators require a control code sequence to redefine a key; Tessy provides a simple display of every available programmable key. Tessy allows users to walk through the display and simply type the new translation for that key interactively rather than send a batch-like control sequence.

Although this tailoring procedure is helpful, the start-up time can be lengthy. To circumvent this, emulators allow users to save their current keyboard configurations. Some products — again, the Tessy system is notable here — offer a menu service that can save and recall up to 10 different keyboard configurations. Hence, a Personal Computer sitting in a public terminal pool can still be made into one's own personal machine and thereby increase overall productivity.

Remote processing

Micro-to-mainframe local-area networks allow a significant portion of processing to be shared with the remote microprocessors. Thus, printing and data storage for a word processing system can be done centrally, but the actual editing can be done off-line on the local microprocessor.

All terminal emulators provide the ability to transfer files. Data can be downloaded through the emulator to the local Personal Computer for editing, and then the final product can be uploaded and stored on the host mainframe. Two important features sometimes supplement the transfer process: memory residency and preset file-transfer menus.

Memory-resident Vterm II can remain connected to the host while also granting access to the local Microsoft Corp. MS-DOS environment. Because file transfers usually travel over telephone lines, it is not uncommon for line noise to create intermittent garbage in the transmission. The memory-resident feature allows users to transfer the file and check its integrity before logging off the host. Hence, with Vterm II one can do the transfer, hit both Shift keys simultaneously to land in MS-DOS, check the file, hit the Shift keys again to bounce back to the host and then log off.

Vterm II does not require a reload when a user plans only on editing or just scanning the file for five minutes and then replacing it. It allows users to bounce back and forth between environments at their convenience, rather than the machine's.

The second important feature involves file transfer menus. Some emulators do not have any — they prompt for the file name each time a transfer is requested. A better schema is a menu that can be preset to the file name with which a user knows he will be working. With this feature, the Personal Computer can help by knowing what is being worked on without incessantly requesting its name.

Graphics and other idiosyncracies

Care must be taken to find an emulator that understands standard graphics protocol. One cannot assume a graphics-oriented PC will act like a graphics terminal. Microsystems Co.'s Call implements an emulator that provides Regis protocol compatibility to the mainframe host. Also, ID Systems' Tessy can double as a Textronix, Inc. 4010 graphics emulator.

All of these packages — be they graphics or not — have idiosyncracies that should be examined prior to their selection for product development. Most vendors will gladly send a demonstration kit to a user facility if that facility agrees to pay return postage. This is the best advice: Users should try out the product to explore whether it has the required functionality.

Finally, for those facilities that house hardware products from more than one manufacturer, the terminal emulator option offers additional advantages. Some emulators, such as Communications Research Group's Blast, will standardize communications protocols for about 100 micro-mainframe combinations. Thus, one product can coordinate and organize access to a variety of hardware environments.

Terminal emulators provide management with greater flexibility for making hardware procurement decisions. The only systems for which they are inappropriate are critical real-time applications because users lose the speed of a terminal's firmware; it has been replaced by the portability of software. With a small cost increase, so much more computing power can be obtained with a micro network that terminal emulators can easily be said to outdistance the components they were designed to imitate. ■

Fisher is a systems security analyst for a U.S. Air Force contractor at the Eastern Space and Missile Center.

standard with this version, Ramdisk, H-Ramdisk and print spooler are included. This board would be my choice for the industry standard.

If the Ready compatibility problem with Microway's Megapage proves to be a minor exception, I would wager that the combined matters of purchase price, warranty and power consumption would sway choice for a specific application. For memory pure and simple, the Cramram with its half slot and 4.35W power consumption would look very good; however, its replacement memory chips are special and could take time to obtain even if there is no premium on their price, whereas a growing list of fine additional boards can use the half slot.

In summary, then, the Cramram has major advantages in certain applications only. If a company requires the networking that the Orchid Conquest offers, the choice is easy. But if the clock and ports are more important, price and warranty matters may offer the only justification, within the expanded memory specification, for choosing one manufacturer over another.

AST Research's long experience with memory additions and its participation in the one expanded memory specification version are matters to keep in mind as well.

Finally, if a board like the Orchid 286E is used, it is most important that zero-wait state 2-byte-bus memory be added. Some of these products may be able to use EMS boards, but they will run many times faster from their own extended or expanded memories.

EMS software issues

Two programs must receive mention in the context of an expanded memory review. Windows from Microsoft and Desqview from Quarterdeck Office Systems of Santa Monica, Calif., will become ongoing facts of life for software writers and a great many users.

Because it is from Microsoft, Windows is quite likely to become a standard. This program does not use expanded memory to hold several programs in memory at the same time, as is widely believed. What it does do is provide the option of loading H-Ramdisk in expanded memory and setting Windows to swap programs from DOS memory to this virtual disk.

Also, it runs only one program at a time and requires a graphics capability on the computer for full performance.

Desqview, in contrast, needs the AST/Quadram/Ashton-Tate memory to shine. This program uses no graphics or print drivers of its own but is designed for concurrent processing.

Specific processor and memory advantages arise from the Rampage board's ability both to extend DOS memory and then to switch this extended memory with expanded memory under Desqview's control. The critical hardware issue is installed memory.

Finally, Desqview does actually switch programs up and down in expanded memory without the need of an H-Ramdisk. Under Desqview, the Persyst Supercharger leaves a 128K-byte block open for switched operation. Several sizable programs can run at once with this combination, but the programs in the upper 128K bytes of space will run at normal IBM Personal Computer speed, no faster.

Using the Victor board with its hardware cache disabled, a small motherboard memory would allow several large programs or up to nine small ones to run with one Rampage, while several Rampage boards could allow up to nine large concurrent program to run together. But beware: The processor speed, about double that of the Personal Computer, would be divided among all of these programs.

Softlogic offers an independent, low-cost program that simply switches up to 10 other active programs into and out of expanded memory space for memory-resident lovers.

Processor memory choices

Based on either the tested or claimed properties of the equipment involved, these are my choices:

If floating point were the controlling application undertaken, I would expect Microway's Number Smasher with McGraw-Hill's Maxit expansion board to offer the best speed and the highest compatibility available. I

We Can Transport You
Very Own

You'll be light years ahead in data communications with a Siecor fiber optic star system for your LAN. Because, our Ethernet-compatible star system stems from extensive fiber optic experience. We've designed and made hundreds of reliable fiber optic products. And pioneered many significant advancements.

Siecor Ethernet products can create a backbone for your LAN, connecting multiple coax Ethernet segments and extending node separation to 2.5 km. If a harsh environment is your problem, we have an all fiber optic solution. And we can remotely link your building with point-to-point optical connections via bridges and repeaters.

Siecor can design, install and test your system. And serve as your single source for

> ***When IBM's managers set the personal computer standard with the selection of the Intel 8088 CPU chip, they proved they had learned a lesson. While Detroit must virtually reinvent the car every three years, IBM over many years has shown a commitment to upward compatibility.***

would install a 256K-byte cache in the high memory, where speed is not critical, and use the 640K-byte option on the Number Smasher board for the number crunching. But I would not quarrel with the use of any EMS board in place of the Maxit, and if the programs were modest in size, I would not argue against using the Persyst board.

If overall speed in differing applications were most important, I would recommend the Orchid 286E with its 1M-byte daughterboard and a 512M-byte cache in old system memory. For frequent floating-point operations, I would add the 8-MHz Intel 80287.

For conditions that call for one large and several small concurrent programs to be run, I recommend the Persyst Supercharger and the AST Rampage with its bundled Desqview, but I would not object to the Number Smasher used without daughter memory.

If several large programs were to be run concurrently and if a lower level of overall performance could be tolerated, I would substitute the Victor Speedpac with its hardware cache disabled. (The nature of these hardware caches is generally incompatible with Desqview.) I would look more highly on this Victor combination if only the cache would function with Desqview. For floating-point operations in either case, I would add the 8087 or 80287. In both of these cases, I would recommend an expanded memory cache program even though it will reduce memory available to swap applications.

Unlike Detroit

When IBM's managers set the personal computer standard with the selection of the 8088, they proved they had learned a lesson. While I am told that Detroit must virtually reinvent the car every three years, IBM has shown a commitment to upward compatibility.

In the microprocessor world, from its beginning throughout the 1970s, Intel demonstrated a similar commitment. For more than a decade, Intel produced a series of microprocessors whose instruction sets were each a superset of the others. Anyone, with the wisdom of hindsight, can see the importance of this pattern. But Intel broke this pattern with the 80286 CPU chip.

The 80286 chip runs two modes. The first, which Intel calls "real," *almost* perfectly copies the functions of the 8088 and 8086 parent chips. Even with this high degree of similarity, however, incompatibilities still appear between the processors, as virtually all AT users will attest. In its second, "protected" mode, the 80286 no longer operates with an absolute instruction superset of the 8088 and 8086, and compatibility issues can become quite complex. Unfortunately, it is in the protected mode that the 80286 chip exhibits most of its advanced features. Owing heavily to this incompatibility issue, the 80286 is often an underutilized processor.

Creating the 80286 was also a hard-luck project. Perhaps Intel attempted to do too much, but the original 80286 and several subsequent modifications came into being replete with bugs in theory and in operation. Design bottlenecks restricted the chip's original performance levels, and a long series of problems severely impaired its usefulness in the protected mode.

And just now the 80386 is seeing its first silicon. I believe that Intel learned a very important set of lessons from its 80286 setbacks and failures. I also believe that

At Light Speed To Our Star System.

a full range of fiber optic products. Like optical transceivers with built-in CD Star couplers and wiring centers. Fiber optic cable. And Collision Detection Electronics which offer added protection as well as the flexibility to upgrade. And it's all in compliance with Ethernet.

If you'd like to install and test optical and coaxial transceivers yourself, Siecor's Portable Ethernet Transceiver Tester can help. And it can verify compatibility with IEEE 802.3 standards.

So make a quantum leap in data communications. Contact Siecor Corporation, Electro Optic Products, P.O. Box 13625, Research Triangle Park, NC 27709-3625. Telephone 919/549-6571.

SIECOR

> ***The next generation of workstations will probably not call managers in the morning to bring them up to date on overnight developments, but the generation after that just might.***

some of the people on the 80386 project have proved to be unusually gifted. The result is that the 80386 chip promises to become in reality very nearly what it has been in prospect: a giant advance in microprocessor design that still retains access to our huge existing software base.

For illustration, Intel claims 3 million to 4 million instructions per second and 1.8 million Whetstones for boards using the fastest 80386 system — performance levels from several times to scores of times better than the best that the upgraded Personal Computers can be expected to manage. While other producers of microprocessors may claim similar or superior results, none of these alternative designs are compatible with the IBM PC standard. Without compatibility, a new design is generally barred from the current software base and from practical consideration as an IBM PC replacement.

If, as I predict, Intel's design efforts are successful, the full power of the 80386 will be available in a very special "Virtual 86" mode, where most of our current software base will be able to run independently under its own copy of DOS. Using this mode, the 80386-based computer promises to act as if it had a very fast 8086 imbedded within it.

In this environment, virtual memory and concurrent system functions would lie under the control of the 80386-based hardware and its separate operating system, while the pseudoembedded 8086 would run application programs at a very high effective clock rate. Expected performance levels might generally equal that of several of our current Personal Computers running together; for numeric operations, the levels might equal those achieved by dozens of simultaneously operating contemporary PCs.

Actual compatibility in this environment will depend upon both the original programs and the new operating system for the 80386, but users might expect to see — in the next 20 to 40 months — a new personal workstation that will run most of our present software base concurrently, will yield the processor power of a minicomputer and will make obsolete just about anything in the PC field that has come before it. If the next decade's promises of large, reliable electrically erasable programmable read-only memories and read/write compact disks are fulfilled, these personal workstations will come to have megabytes and perhaps tens of megabytes of electronic nonvolatile memory and hundreds of megabytes of disk memory.

The next generation of workstations will probably not call managers on the phone in the morning to bring them up to date on overnight developments, nor will it read them the six- and 12-hour weather forecasts, but with certain software advances now brewing, the generation after that just might.

Dangerously little of this upgrade capability will be suitable for retrofitting to existing PC ATs or clones. With this limitation as a prospect, I strongly recommend upgrading existing Personal Computers and replacing them only when the next generation of equipment becomes cost-effective — possibly two years from now. I also most strongly recommend against acquisitions that cannot be amortized over the next 20 to 40 months. ■

FAST

...BUT VSAM-ASSIST IS MUCH MORE!

softworks Inc.

Softworks, Inc.
7700 Old Branch Avenue
Clinton, Maryland 20735
For Information:
In U.S. call 1-800-638-9254
In Canada call (301) 856-1892

VSAM-ASSIST
A High-Speed Backup/Restore Facility For VSAM Datasets and Catalogs

- High Speed Mass Backup to a Single Backup Dataset
- Selective Restore with Dataset Renaming
- Automatic DASD Space Computation/Adjustment
- Mass-Migrate Datasets and Catalogs from VSAM to ICF

EGA?
QUADRAM,
OF COURSE.

Move ahead with the Quadram EGA Solution. Together, our new enhanced monitor and video board deliver the extended color selection and crisp resolution that makes all your work look better. And when your work looks better, you look better too.

QuadChrome Enhanced Display

Begin your move with our new EGA monitor, for brilliant graphics in enhanced mode and bright, colorful displays in standard mode. A big 13" screen, built-in green/amber switch for extra sharp text, and a tilt/swivel base combine to bring you comfortable, easy-on-the-eyes viewing.

QuadEGA+ Graphics Adapter

Next, our full-performance EGA board, 100% compatible with the four PC display standards: Enhanced graphics. Standard color graphics. Hercules monochrome graphics. And monochrome text. Across the board compatibility like this means you can use all your current software and still be prepared for the future. Plus, with both our EGA board and monitor, you get an extended two year warranty for the ultimate in reliable performance.

Where do you go for EGA performance like this? Your authorized Quadram dealer, of course. Don't wait. Move ahead now. For more information, contact us at One Quad Way, Norcross GA 30093; (404) 564-5566.

IBM is a trademark of International Business Machines, Inc. Hercules is a trademark of Hercules Graphics Products. QuadEGA+ and QuadChrome Enhanced Display are trademarks of Quadram Corp. Quadram and the Quadram logo are registered trademarks of Quadram Corp.

The Quadram EGA Solution
BOARD $595 MONITOR $795

QUADRAM®
An Intelligent Systems Company

NEW PRODUCTS

INSIDE

Software & Services/**82**
Microcomputers/**82**
Communications/**102**
Systems & Peripherals/**104**
Price Reductions/**104**

Data Group field service tool debuts

The Small Systems Group of The Data Group Corp. located in Burlington, Mass., has announced the release of Microfieldwatch, a microcomputer-based software package designed for field service management applications.

Developed for the IBM Personal Computer AT and compatibles, Microfieldwatch is composed of two modules: Dispatch-Plus, a stand-alone module for tracking and controlling service calls of all types, and Logistics-Plus, an integrated module for tracking and controlling parts inventory.

According to a company spokesman, Microfieldwatch offers an on-line fully integrated management capability. It can be used as a stand-alone software program or packaged with a specific hardware configuration to provide a complete turnkey system.

The modules are menu driven and feature extensive on-line Help screens as well as documentation. Specifically, the Dispatch-Plus module was designed to guide the service dispatcher through all phases of the service call, including on-line call handling, assignment dispatching and real-time incident tracking.

Logistics-Plus is a closed-loop system that is said to control a company's inventory from its central warehouse to service representatives. It was designed to track parts within a spare-parts network and accommodates both internal parts movement and external parts tracking through outside sources. Logistics-Plus must be used in conjunction with Dispatch-Plus.

Microfieldwatch is priced at $4,000 for a single-user module and $7,500 per multiuser module. It comes with a service and support program that includes preinstallation consultation, hardware and software requirements evaluation and intial as well as on-going training and technical support.

Microfieldwatch is based on the same concepts as the company's Fieldwatch field service management software product for mainframe and minicomputer systems, introduced in 1980.

Lasercontrol 100 bows

Allows HP's Laserjet to emulate seven printers

Hewlett-Packard Co.'s Laserjet printer now can emulate seven other printers with Lasercontrol 100, a $150 software program introduced last month by Insight Development Corp. of Moraga, Calif.

Currently distributed by HP's Direct Marketing Division, Lasercontrol's printer emulation facility provides compatibility between the Laserjet and all IBM Personal Computer software applications programs, according to Insight. These software packages need not specifically support the Laserjet.

Lasercontrol emulates Qume Corp.'s Sprint, NEC Information Systems, Inc.'s 3550, 5510 and 7710, Xerox Corp.'s Diablo 630, Epson America Corp.'s MX-80 and IBM Graphics printers.

Besides printer emulation, Lasercontrol provides menu-driven control of the Laserjet, replacing the need to use complex escape code sequences, the vendor said.

The menu is provided as both a standard IBM PC-DOS application or as a memory-resident program that can be accessed by pressing Shift-Prsc. Both versions of Lasercontrol are provided on the disk.

The menus allow the Laserjet user to set character spacing, margins, number of lines and pages, font cartridge, page orientation (horizontal or vertical) and type style (point, font and pitch).

In addition, the menus let users redirect printer output to another printer or turn the Laserjet into a copy machine that can print up to 99 copies of each page.

Lasercontrol runs on IBM PC, Personal Computer XT, AT and compatible machines with a minimum of 128K bytes of random-access memory and is not copy protected.

The program supports both the Laserjet and Laserjet Plus printers.

Borland unveils Reflex upgrade, Sidekick version for Mac Plus

Borland International, Inc. of Scotts Valley, Calif., has enhanced its Sidekick for the Macintosh to support Apple Computer, Inc.'s Macintosh Plus.

The new version supports the Macintosh Plus' expanded read-only memory and Finder 5.1 system software.

New features include an enlarged and field-sortable Phonebook, autodialing through a modem with either tone or pulse dialing and data transfer from the Phonebook feature to the Macintosh Clipboard.

It also includes an option for a column for dollars and cents in the Quiksheets feature and support for the Epson Corp. family of dot matrix printers and the Thinkjet from Hewlett-Packard Co.

Borland also recently announced an upgrade of Reflex, the Analyst, a relational data base management program that runs on IBM Personal Computers and compatible systems.

The upgrade reportedly includes support for expanded memory under the Lotus/Intel/Microsoft Expanded Memory Specification or AST/Quadram/Ashton-Tate Enhanced Expanded Memory Specification.

Version 1.1 also supports as many as 32,500 records in memory and 250 fields, compared with the 16,000 records and 128 fields permitted under Version 1.

Updates are available from Borland for $10.

The update is available for $19.95 for registered Sidekick owners who bought the product before Dec. 15, 1985.

Registered owners who bought after that date will receive the upgrade and new documentation free of charge.

Registered users who have not purchased Borland's Phonelink communications accessory can get the update with Phonelink for $29.95.

Sidekick for the Macintosh with Phonelink is priced at $99.95.

Concerto line enhanced

Leblond products tune up Symphony

Adding to its Concerto family of products designed to allow users to create add-ins for Lotus Development Corp.'s Symphony software, Leblond Software, Inc. of Indianapolis recently introduced $99 versions of Concerto for IBM's Compiled Basic and Borland International, Inc.'s Turbo Pascal.

Symphony add-ins are programs that attach to Symphony and become an integral part of it. They can either enhance Symphony's current functionality or provide links to other programs or computer systems. Concerto products allow developers to design add-ins using high-level programming languages rather than assembly language.

According to a company spokesman, Concerto's high-level language allows users to take advantage of Symphony's built-in hooks.

Basic Concerto, released last September, allows developers to use Interpreted Basic to design Symphony add-ins. Compiled Basic Concerto lets developers use Microsoft Corp.'s Quickbasic Compiler or IBM's Basic Compiler Version 2. Pascal Concerto works with Borland's Turbo Pascal.

Leblond also is designing software to run with Lotus' 1-2-3. Leblond will offer Concerto versions for 1-2-3 in the same languages offered for Symphony, with products expected later this year.

General Parametrics' Videoshow gets presentation software, printer

General Parametrics Corp. of Berkeley, Calif., has announced two products designed to enhance the capabilities of Videoshow, its microcomputer-based presentation system.

The first product is a version of Freelance, a presentation software product from Graphic Communications, Inc., and the second is the Xerox 4020 Color Ink Jet Printer from Xerox Corp.

Freelance for Videoshow features a symbol library with almost 400 symbols and images as well as draw capability. According to a company spokesman, Freelance allows the presenter to produce not only professional-quality business graphics but custom images such as logos as well.

The Xerox 4020 Color Ink Jet Printer provides Videoshow users with color output for reprints, handouts and color transparencies.

Freelance for Videoshow is priced at $395. The Xerox 4020 Color Ink Jet Printer costs $1,495.

According to the vendor, the Videoshow product line of hardware and software is a complete business presentation system, offering output options in different media from video to slides to hard copy.

Videoshow products utilize a proprietary technology developed by General Parametrics, said to enable them to use 1,000 colors on the screen and to display high-resolution images.

SOFTWARE & SERVICES

Systems software

Applied Data Research, Inc. has enhanced its **ADR/Roscoe** on-line programming system to be used in MVS environments.

New features in the Roscoe Programming Facility (RPF) permit internal subroutines and allow direct reading of Roscoe library members into RPF variables. Multiple Roscoe commands can now be saved as they are executed, listed and recalled to allow changes and re-execution.

Other features include extensions to the Response Time Monitor and enhanced capabilities in the communications facility. Also the Extended Time Sharing option has been enhanced.

Roscoe costs $60,400.

Applied Data Research, CN-8, Rt. 206 & Orchard Road, Princeton, N.J. 08540.

Applications packages

The Acme Computer Co. has ported its **Linear Optimizer** general-purpose linear programming package for personal computers to the Plexus Computers, Inc. family of supermicros under Unix System V.

The package consists of an integrated matrix generator said to accept a formula-oriented matrix generation language, including features such as read and write statements and conditional expressions; a solution procedure, which is a primal or dual simplex algorithm operating on a sparse matrix representation; and a report writer.

Linear Optimizer is priced at $1,000.

Acme Computer, P.O. Box 51193, Seattle, Wash. 98115.

■

AGS Management Systems, Inc. has ported its **PAC III** project management system to the Digital Equipment Corp. Microvax II.

PAC III is said to be capable of handling projects with many thousands of activities, resources and network relationships, including software engineering, the design of electronic components and development of drug compounds.

Previously PAC III was available on large mainframes from IBM and DEC.

PAC III is priced at $30,000. Plotter software for drawing wall-size network and bar charts and color graphics software are available for $4,000 each.

AGS Management Systems, 880 First Ave., King of Prussia, Pa. 19406.

■

Gateway Design Automation Corp. has introduced **Stafsim**, a statistical fault analysis software package said to provide digital circuit coverage as well as a logic simulator.

Stafsim covers potential circuit faults, including those that occur at the inputs of circuit elements. It offers interactive logic simulation and primitives for functional, gate and switch-level simulation.

Stafsim was designed to be machine independent. Versions are currently available for Digital Equipment Corp. VAX, Apollo Computer, Inc., Sun Microsystems, Inc. and IBM mainframes. Price ranges from $5,000 to $20,000 per machine.

Gateway Design Automation, P.O. Box 1545, 235 Great Road, Littleton, Mass. 01460.

Training software

Computer Systems Research, Inc. has introduced a new version of its **self-study, computer-aided instruction courseware** package, designed to teach the fundamentals and use of IBM's JES3 operating system.

According to a company spokesman, the package has been expanded from 39 to 42 lessons and includes more examples and questions as well as expanded information.

It runs on either an IBM Personal Computer equipped with the vendor's Trainer 4000 Presentation System or on a mainframe that utilizes IBM's Interactive Instructional System.

The package is priced at $1,500 per course.

Computer Systems Research, P.O. Box 45, Avon Park S., Avon, Conn. 06001.

Services

Compuserve, Inc. has added access to an additional 700 data bases through its **Compuserve Information Service**.

The data bases are made available to subscribers through Iquest, a gateway service developed by Compuserve and Telebase Systems, Inc. Subjects range from business and technology to humanities and social sciences.

The data bases fall into two categories: full text and bibliographic. Searching a full-text data base provides up to 15 titles per search. Bibliographic data bases show up to 10 citations per search.

Subscribers pay $7 per search in addition to connect charges of $12.50 per hour during business hours and $6 per hour during nonbusiness hours.

Compuserve, P.O. Box 20212, 5000 Arlington Centre Blvd., Columbus, Ohio 43220.

MICROCOMPUTERS

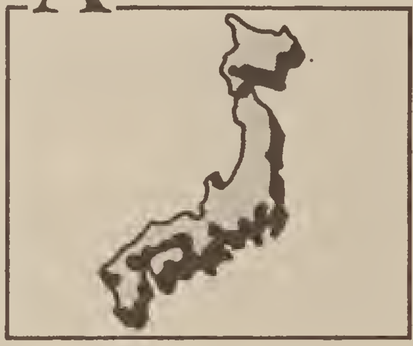
Software applications packages

McDonnell Douglas Information Systems Group has unveiled **FM/PC**, a facility management software system for the IBM Personal Computer.

The system, developed by Re-

Continued on page 84

ADVERTISE IN COMPUTERWORLD JAPAN—JAPAN'S LEADING COMPUTER PUBLICATION.



Here's your chance to advertise your products in Japan's leading computer news publication — *Computerworld Japan*. Your ads in *Computerworld Japan* will reach the MIS/DP directors and key technical staff at virtually all the major computer-using sites in Japan.

Modeled after its' sister publication in the U.S., *Computerworld, Computerworld Japan* covers the latest developments in the Japanese computer industry. Each week, over 35,000 readers turn to *Computerworld Japan* for information on new products and services, current applications, industry trends and international events.

CW International Marketing Services makes advertising your products in Japan, and around the world, easy. We have over 55 publications in more than 25 countries. For more information on our wide range of services, including frequency discounts, translation services and billing in U.S. currency, complete the coupon below and mail today.

CW COMMUNICATIONS/INC.

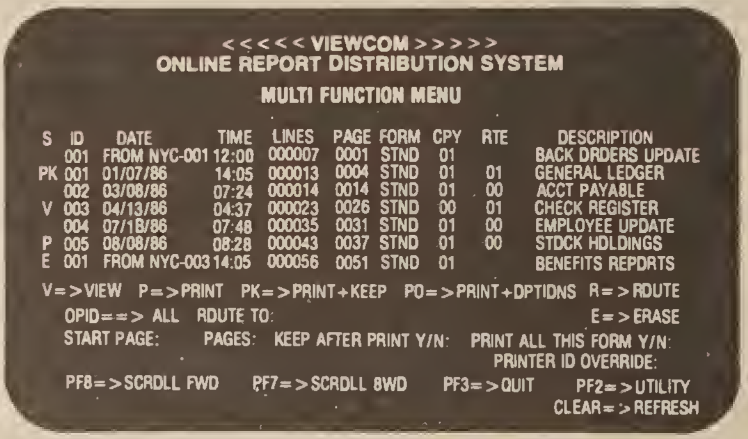
Frank Cutitta
Managing Director
International Marketing Services
CW Communications/Inc.
375 Cochituate Road
Framingham, MA 01701-9171

Please send me more information on:
☐ *Computerworld Japan*
☐ Your other foreign publications
☐ Your brochure "The Computer Marketplace in Japan"

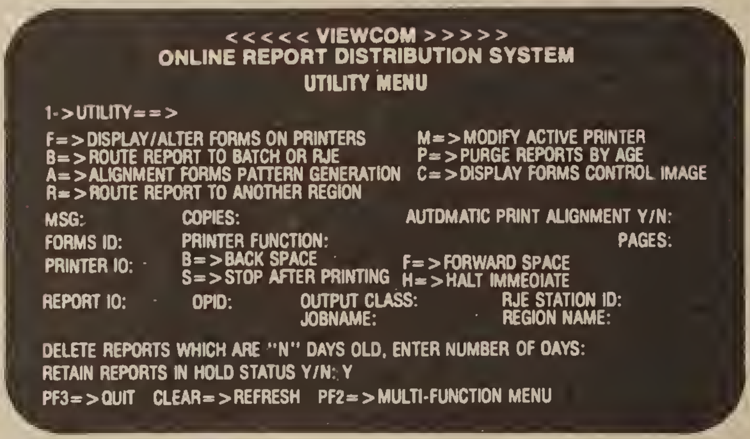
Name ____
Title ____
Company ____
Address ____
City ____ State ____ Zip ____

VIEWCOM

Automatic Report Management And Distribution System

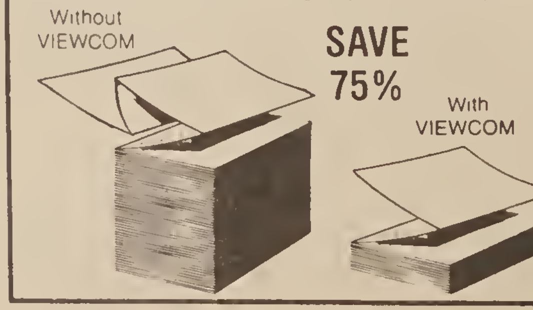


```
          <<<<< VIEWCOM >>>>>
    ONLINE REPORT DISTRIBUTION SYSTEM
          MULTI FUNCTION MENU

S  ID   DATE          TIME  LINES  PAGE FORM CPY RTE   DESCRIPTION
   001  FROM NYC-001 12:00  000007 0001 STND 01        BACK ORDERS UPDATE
PK 001  01/07/86     14:05  000013 0004 STND 01   01   GENERAL LEDGER
   002  03/08/86     07:24  000014 0014 STND 01   00   ACCT PAYABLE
V  003  04/13/86     04:37  000023 0026 STND 00   01   CHECK REGISTER
   004  07/18/86     07:48  000035 0031 STND 01   00   EMPLOYEE UPDATE
P  005  08/08/86     08:28  000043 0037 STND 01   00   STOCK HOLDINGS
E  001  FROM NYC-003 14:05  000056 0051 STND 01        BENEFITS REPORTS
V=>VIEW  P=>PRINT  PK=>PRINT+KEEP  PO=>PRINT+OPTIONS  R=>ROUTE
  OPID==> ALL  ROUTE TO:                                E=>ERASE
  START PAGE:     PAGES:  KEEP AFTER PRINT Y/N:  PRINT ALL THIS FORM Y/N:
                                                 PRINTER ID OVERRIDE:
  PF8=>SCROLL FWD   PF7=>SCROLL BWD   PF3=>QUIT    PF2=>UTILITY
                                                   CLEAR=>REFRESH
```



```
             <<<<< VIEWCOM >>>>>
       ONLINE REPORT DISTRIBUTION SYSTEM
                 UTILITY MENU
1->UTILITY==>
F=>DISPLAY/ALTER FORMS ON PRINTERS          M=>MODIFY ACTIVE PRINTER
B=>ROUTE REPORT TO BATCH OR RJE             P=>PURGE REPORTS BY AGE
A=>ALIGNMENT FORMS PATTERN GENERATION       C=>DISPLAY FORMS CONTROL IMAGE
R=>ROUTE REPORT TO ANOTHER REGION
MSG:          COPIES:                     AUTOMATIC PRINT ALIGNMENT Y/N:
FORMS ID:     PRINTER FUNCTION:                                   PAGES:
PRINTER ID:   B=>BACK SPACE            F=>FORWARD SPACE
              S=>STOP AFTER PRINTING   H=>HALT IMMEDIATE
REPORT ID:    OPID:     OUTPUT CLASS:        RJE STATION ID:
                        JOBNAME:             REGION NAME:
DELETE REPORTS WHICH ARE "N" DAYS OLD, ENTER NUMBER OF DAYS:
RETAIN REPORTS IN HOLD STATUS Y/N: Y
PF3=>QUIT  CLEAR=>REFRESH  PF2=>MULTI-FUNCTION MENU
```

- Multi-Function Menu Gets You There Faster
- On-Line Report Viewing Saves Paper
- PC Support Puts PCs To Work
- Automatic Routing Speeds Report Distribution
- Automatic Archive Purge/Restore Eliminates Report Reruns
- Automatic Report Segmentation/Bundling Saves Time
- MVS/XA, MVS/SP, MVS, OS/VS1, DOS/VSE



StarTech Software Systems Inc.
25-15 50th Street, Woodside, New York 11377 (718) 204-2119
05MAY86

NAME ____ TITLE ____
COMPANY ____ ADDRESS ____
CITY ____ STATE ____ ZIP ____
PHONE ____ IBM OPERATING SYSTEM ____

WITH DATA GENERAL, YOUR STAND-ALONE PC'S NO LONGER HAVE TO STAND ALONE.

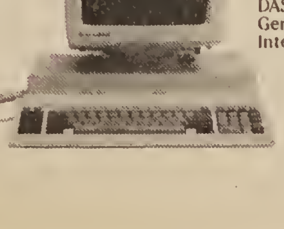
NOW CEO FULLY INTEGRATES YOUR EXISTING OFFICE SYSTEMS.

No matter how close your PC's may be, IBM® doesn't seem close to giving you a true integration solution.

CEO Write™ word processing now operates on IBM PC's and compatible intelligent workstations, like the DASHER/One.™ And CEO Connection™ gives them the flexibility to move between stand-alone applications and full office automation. With a single keystroke.

The Data General MV/2000DC™ computer is the new price/performance leader in departmental systems. Which lets you automate each department at a surprisingly low cost.

The latest enhancements to CEO® (comprehensive electronic office) give you complete integrated business automation. From desk to desk. From department to department. From the company that keeps you a generation ahead. To find out more, call 1-800-DATAGEN. Or write Data General, 4400 Computer Drive, Westboro, MA. 01580.



Data General
a Generation ahead.

© 1986, Data General Corporation, Westboro MA.
CEO is a registered trademark and MV/2000DC, CEO Write, DASHER/One and CEO Connection are trademarks of Data General Corporation. IBM is a registered trademark of International Business Machines Corporation.

NEW PRODUCTS/MICROCOMPUTERS

Continued from page 82

source Dynamics, Inc., operates in conjunction with the McDonnell Douglas computer-aided design product, Graphics Design System. It includes a relational data base and five facility planning functions: inventory, forecasting, affinity optimization, stack planning and lease management.

FM/PC is priced at $19,000.

McDonnell Douglas, P.O. Box 516, St. Louis, Mo. 63166.

■

McDonnell Douglas Communications Industry Systems Co. has announced **Microcube**, personal computer software for financial planning.

Designed for use on IBM PC-DOS- and Microsoft Corp. MS-DOS-compatible systems, Microcube is a fully integrated system for organizational modeling and business planning.

It offers a spreadsheet that organizes data into rows, columns and pages. The product can spread a year-end forecast over the months of a given year. It color codes values that have been input, locked, recalculated or left unchanged.

Microcube costs $1,200.

McDonnell Douglas, Suite 200, 7535 E. Hampden Ave., Denver, Colo. 80231.

■

American Business Computer Development Systems, Inc. has ported its **Workstation Basic** programming environment to the Santa Cruz Operation, Inc. Xenix operating system.

The Xenix version provides a consistent DOS-like format. It allows program changes and debugging while in execution, according to the vendor.

All Workstation Basic versions feature full screen entry with color support, unlimited file size, integrated index support and file sharing with record locking.

Prices for the programming environment range from $600 for a one- to four-user run version to $2,000 for a 14- to 19-user full version.

American Business Computer Development Systems, Suite 40, 2489 Rice St., Saint Paul, Minn. 55113.

■

Jandel Scientific has announced **Sigma Plot**, a software package designed to create publication-quality graphs and charts for scientists.

Sigma Plot features the ability to produce scatter, line, histogram, bar and grouped-bar charts with one- or two-way standard deviation, standard error of the mean and 95% or 99% confidence interval error bars.

Sigma Plot runs on the IBM Personal Computer, Personal Computer AT, XT or compatibles and Hewlett-Packard Co. or compatible plotters. It costs $350.

Jandel Scientific, 2656 Bridgeway, Sausalito, Calif. 94965

■

Tominy, Inc. has introduced the **Mach 1 Professional Application Developer** (PAD) for IBM PC-DOS and compatible computers.

Mach 1 Pad is a single-user system generation facility. It includes a relational/network/hierarchical data base management system, fourth-generation programming language, application program generator, automatic screen editor, report generator, system utilities and flexible query.

Other features include data base definition and creation utilities, menu and screen painting, interactive testing facilities and global directories.

Mach 1 PAD costs $129.95.

Tominy, 4221 Malsbary Road, Cincinnati, Ohio 45242.

■

Graham Software Corp. has announced **Sclaserplus**, a publishing software package for use with IBM Personal Computers or compatibles and Hewlett-Packard Co.'s Laserjet or Laserjet Plus printers.

According to the vendor,

MANAGEMENT
REPORTING/RETRIEVAL
CAPABILITY
for THE IBM S/38
For more information
Contact Charles White at:
michaels, ross & cole, ltd.
800 West Roosevelt Road
Building E, Suite 304
Glen Ellyn, IL 60137
(312) 790-5040

Boeing Computer Services helped develop and integrate the large-scale information systems that let Boeing introduce the world's most advanced jetliners, the 747, 757, and 767. And helped make Boeing the leading aerospace company in America. What's more, we've applied this home-grown expertise to the complex information needs of large government and commercial customers. So when you're ready to get your big ideas off the ground, we'll know how to make the system work.

Sclaserplus integrates formatted text with business graphics and prints them together. The program includes a full-featured text editor, called Scwriterplus, as well as a user-defined icon or symbol editor, a random-access-memory-resident screen snapshot facility and a text formatter.

Sclaserplus is priced at $495.

Graham Software, 212 King St. W., Toronto, Ont., Canada, M5H 1K5.

Electronic Cottage, Inc. has announced **Image Management System Release 4.3**.

Image Management System is a graphics-presentation program for IBM Personal Computers.

The product combines business graphics with computer-aided design and free-form drawing capabilities. It allows images to be modified, combined, moved, copied; scaled and zoomed. Output can be to color monitors, slide cameras, color printers and plotters.

New features include raster-to-vector conversion, Lotus Development Corp. graphic file input, automatic charting of text charts and print files, compatibility with additional device drivers and improved device handling.

The program is priced at $995.

Electronic Cottage, 1842 Union St., San Francisco, Calif. 94123.

Practicorp International, Inc. has introduced **Executive Training Wheels**, a software program designed to provide computer functionality for the nontechnical manager.

The program runs on the IBM Personal Computer and compatibles. It has three parts: Executype, a self-paced program that teaches basic keyboard concepts; Executwrite, a full-featured word processor; and *The Executive Training Wheels Primer*, a user's manual.

Executive Training Wheels costs $69.95.

Practicorp International, 44 Oak St., Newton Upper Falls, Mass. 02164.

■

Cubicomp Corp. has announced the **Picture Maker/20**, a member of its Picture Maker solid modeling family of three-dimesional computer graphics systems.

The system was designed to create off-line images. Images are stored as computer files that can be transferred to the Picture Maker/30 system through computer networking, disk transfer or cartridge tape.

Picture Maker/20 features 3-D animation and full-color paint software.

Picture Maker/20 is priced at $19,500.

Cubicomp, 3165 Adeline St., Berkeley, Calif. 94703.

■

Eastern Benefit Systems, Inc. has announced **Flex/Net**, software for automating the management of employee flexible spending account benefits and **Admin/Net**, an employee data base system.

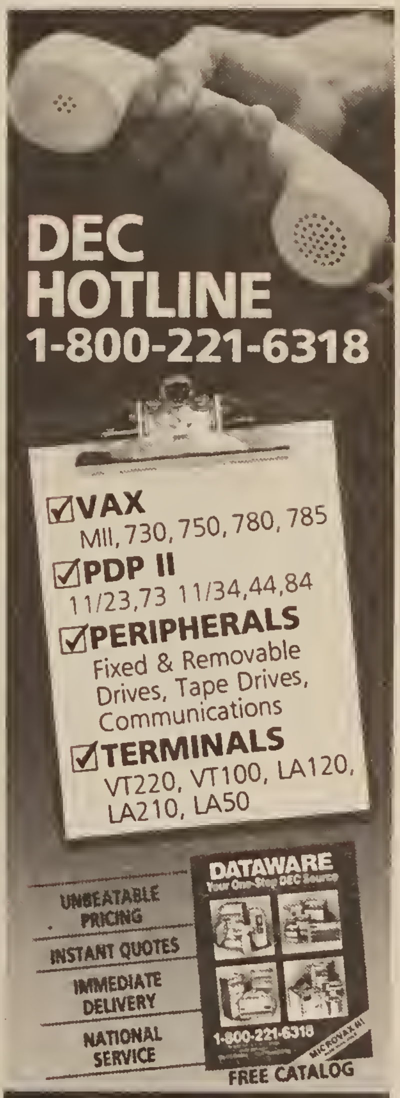
Flex/Net provides an automated audit trail as it verifies payroll deduction data. It determines claim benefits, prints checks and generates explanation statements.

Admin/Net tracks and sorts employee and depen-

Continued on page 86

BOEING COMPUTER SERVICES
A Division of The Boeing Company

BOEING



Dataware
30 Bay St., Staten Island, N.Y. 10301
(718) 447-4911
DEC, VAX, PDP11 are registered trademarks of Digital Equip. Corp.

Continued from page 85

dent data for benefit records.

Both run on IBM Personal Computers and compatibles and can be used stand-alone or with the vendor's Claim/Net System.

A typical Flex/Net system costs $10,000. Admin/Net costs $7,500.

Eastern Benefit Systems, 200 Freeway Drive E., East Orange, N.J. 07018.

■

Success Software has announced **Schedule Graphics**, a program designed to print custom schedule charts from spreadsheet program files.

Schedule Graphics features graphics bar and milestone symbols for depicting activities and their relationships. Text and symbols can be combined and any time scale can be used to graphically display activity status.

Schedule Graphics runs on IBM Personal Computers or compatibles. It requires a dot matrix printer, and Lotus Development Corp.'s 1-2-3 is recommended.

Schedule Graphics costs $55.

Success Software, Suite 448, 14252 Culver Drive, Irvine, Calif. 92714.

■

Primavera Systems, Inc. has introduced **Finest Hour**, a project management system designed for short-duration, high-intensity projects in the power, process and manufacturing industries.

Finest Hour is an extension of the Primavera Project Planner. It can handle up to 10,000 activities. Up to 15 calendars may be defined in terms of hours and days. It can make hourly adjustments during plant maintenance, retrofits and outages.

Finest Hour requires 512K bytes of memory, a hard drive and Microsoft Corp. MS-DOS or IBM PC-DOS 2 or greater. It costs $5,000. Owners of Primavera Project Planner may swap their current software for Finest Hour.

Primavera Systems, Two Bala Plaza, Bala Cynwyd, Pa. 19004.

■

Gamma Productions, Inc. has announced **Multi-Lingual Scribe**, a multilanguage word processing program for IBM Personal Computers and compatibles.

The program allows users to write in combinations of English, most European languages, Hebrew, Greek, Arabic and Russian.

Multiple alphabets can be written in one file as well as viewed on screen and printed without hardware modification. Bidirectional text is fully supported by all the word processing features. Both ASCII files and Micropro International Corp. Wordstar files can be imported.

Multi-Lingual Scribe costs $184.

Gamma Production, Suite 609, 710 Wilshire Blvd., Santa Monica, Calif. 90401.

■

Applied Publishing Technolgoies has announced **Textplanner**, a typesetting-oriented text editor for IBM Personal Computers and compatibles.

Textplanner is based on the resident text entry module of the vendor's Pageplanner composition and page makeup system. It features split-screen editing, pop-up windows and instant access to all existing files from within a story.

The system supports full pathing of directories. It is compatible with Borland International, Inc.'s Turbo Lightning on-line dictionary and thesaurus.

Textplanner costs $495.

Applied Publishing Technologies, P.O. Box 3568, 1200 29th St. NW, Washington, D.C. 20007.

■

Microsystems Engineering Corp. has announced a personal version of its **Mass-11PC** word processing package as well as corporate and professional versions.

The personal version is suitable for floppy-based or laptop systems and small networks. It offers the same keystrokes and file structure as other versions.

The corporate version requires a hard disk and 320K bytes of memory. It is available for the IBM Personal Computer and the Digital Equipment Corp. Rainbow. The professional version is available only for the IBM Personal Computer with a hard disk.

The personal, corporate and professional versions cost $195, $295 and $395, resepctively.

Microsystems Engineering, Suite 400, 2400 W. Hassell Road, Hoffman Estates, Ill. 60195.

■

Softcraft, Inc. has announced **Laser Fonts**, a laser printer program said to provide fonts, downloading and font editing capabilities.

Laser Fonts includes fonts in sizes ranging from eight to 24 points and a data base of more tham 1,500 mathematical and foreign language characters and special symbols.

Laser Fonts works automatically with Microsoft Corp.'s Word and Softcraft Inc.'s Fancy Font and Fancy Word. It runs on IBM PC-DOS and Microsoft MS-DOS computers with the Hewlett-Packard Co. Laserjet Plus, Canon U.S.A., Inc. LBP8A1 and 8A2 and compatible printers.

Laser Fonts costs $180.

Softcraft, 222 State St., Madison, Wis. 53703.

■

AT&T Information Systems and **Innovative Software, Inc.** have an-

Continued on page 90

SAS Institute Inc. Announces

Lattice C Compilers for Your IBM Mainframe

Two years ago...
SAS Institute launched an effort to develop a subset of the SAS® Software System for the IBM Personal Computer. After careful study, we agreed that C was the programming language of choice. And that the Lattice® C compiler offered the quality, speed, and efficiency we needed.

One year ago...
Development had progressed so well that we expanded our efforts to include the entire SAS System on a PC, written in C. And to insure that the language, syntax, and commands would be identical across all operating systems, we decided that all future versions of the SAS System—regardless of hardware—would be derived from the same source code written in C. That meant that we needed a C compiler for IBM 370 mainframes. And it had to be good, since all our software products would depend on it.

So we approached Lattice, Inc. and asked if we could implement a version of the Lattice C compiler for IBM mainframes. With Lattice, Inc.'s agreement, development began and progressed rapidly.

Today...
Our efforts are complete—we have a first-rate IBM 370 C compiler. And we are pleased to offer this development tool to you. Now you can write in a single language that is source code compatible with your IBM mainframe and your IBM PC. We have faithfully implemented not only the language, but also the supporting library and environment.

Features of the Lattice C compiler for the 370 include:

- **Generation of reentrant object code.** Reentrancy allows many users to share the same code. Reentrancy is not an easy feature to achieve on the 370, especially if you use non-constant external variables, but we did it.
- **Optimization of the generated code.** We know the 370 instruction set and the various 370 operating environments. We have over 100 staff years of assembler language systems experience on our development team.
- **Generated code executable in both 24-bit and 31-bit addressing modes.** You can run compiled programs above the 16 megabyte line in MVS/XA.
- **Generated code identical for OS and CMS operating systems.** You can move modules between MVS and CMS without even recompiling.
- **Complete libraries.** We have implemented all the library routines described by Kernighan and Ritchie (the informal C standard), and all the library routines supported by Lattice (except operating system dependent routines), plus extensions for dealing with 370 operating environments directly. Especially significant is our byte-addressable Unix®-style I/O access method.
- **Built-in functions.** Many of the traditional string handling functions are available as built-in functions, generating in-line machine code rather than function calls. Your call to move a string can result in just one MVC instruction rather than a function call and a loop.

In addition to mainframe software development, you can also use our new cross-compiler to develop PC software on your IBM mainframe. With our cross-compiler, you can compile Lattice C programs on your mainframe and generate object code ready to download to your PC.

With the cross-compiler, we also offer PLINK86™ and PLIB86™ by Phoenix Software Associates Ltd. The Phoenix link-editor and library management facility can bind several compiled programs on the mainframe and download immediately executable modules to your PC.

Tomorrow...
We believe that the C language offers the SAS System the path to true portability and maintainability. And we believe that other companies will make similar strategic decisions about C. Already, C is taught in most college computer science curriculums, and is replacing older languages in many. And almost every computer introduced to the market now has a C compiler.

C, the language of choice...
C supports structured programming with superior control features for conditionals, iteration, and case selection. C is good for data structures, with its elegant implementation of structures and pointers. C is conducive to portable coding. It is simple to adjust for the size differences of data elements on different machines.

Continuous support...
At SAS Institute, we support all our products. You license them annually; we support them continuously. You get updates at no additional charge. We have a continuing commitment to make our compiler better and better. We have the ultimate incentive—all our software products depend on it.

For more information...
Complete and mail the coupon today. Because we've got the development tool for your tomorrow.

SAS Institute Inc.
SAS Circle, Box 8000
Cary, NC 27511-8000
Telephone (919) 467-8000 x 7000

I want to learn more about:

☐ the C compiler for MVS software developers
☐ the C compiler for CMS software developers
☐ the cross-compiler with PLINK86 and PLIB86

today...so I'll be ready for tomorrow.

Please complete or attach your business card.

Name ______
Title ______
Company ______
Address ______
City ______ State ______ ZIP ______
Telephone ______

Mail to: SAS Institute Inc., Attn: CC, SAS Circle, Box 8000, Cary, NC, USA. 27511-8000. Telephone (919) 467-8000, x 7000

05MAY86 CW

SAS is the registered trademark of SAS Institute Inc., Cary, NC, USA. Lattice is the registered trademark of Lattice, Inc. PLINK86 and PLIB86 are trademarks of Phoenix Software Associates Ltd.
UNIX is the trademark of AT&T. Copyright © 1985 by SAS Institute Inc. Printed in the USA.

NCR
introduces
a number of
innovations.
The
9800.

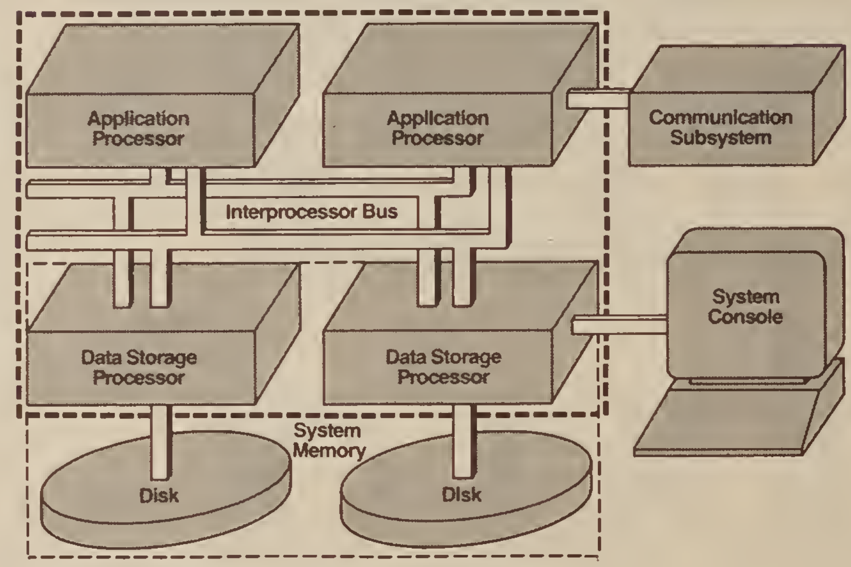
The evolution of the mainframe.

You have probably heard a lot about the computer revolution.

But revolution isn't the best way for a computer to change.

Evolution is. And the new NCR 9800 is a perfect example.

HOW TO BUILD AN EVOLUTION.



The evolutionary architecture in a 9800. Loosely coupled processors, connected by buses, let you upgrade in smaller slices and process faster.

The secret is architecture.

Inside the 9800, we loosely couple powerful application processors (these do the work), with data storage processors (these manage the work flow).

What does this mean to you?

Say your business, like most, processes its transactions in peaks and spurts. A 9800 can handle your work load better and ensure quicker response than a conventional mainframe of comparable power.

You see, we developed a special "system memory" for your most frequently used files. And all the processors can share these files. Automatically. What's more, the processors team up—again, automatically—during these peaks, so the system has the agility to process increased work loads, whenever they occur.

Sounds simple, but conventional mainframes can't do it unless someone writes complicated application software.

With a 9800, it's part of the system.

So the computer is more efficient, more economical, and very flexible.

HOW TO GROW A MAINFRAME.

The 9800 doesn't have to be upgraded in large pieces.

It grows gradually, just the way a business grows.

You start with the power you need, and then you can expand in smaller increments than with conventional mainframes.

You can even add job-specific modules to handle specific functions.

IT'S MORE FAULT-TOLERANT THAN YOU ARE.

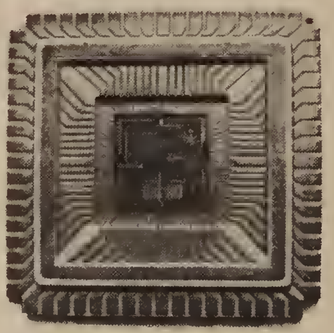
Conventional fault-tolerant systems work one of two ways: Either by doing the work twice, which is unproductive, or by using a software solution that slows processing down.

We invented a more efficient system.

Set up a 9800 for fault-tolerance and, if a module fails, other modules take over while continuing to do their own jobs.

It'll run during a processor failure. Or a software failure.

It'll even run during routine maintenance or upgrading.



NCR's highly-reliable 32-bit VLSI processor chip.

It's built with 32-bit VLSI technology that has fewer components than conventional technology.

So, the chance of a failure inside the 9800 is very slim.

Because if something isn't there, it can't break.

THE REST.

The 9800 was built to be an excellent on-line transaction processor and an excellent general purpose processor.

So it can be tailored to do both jobs more economically than conventional mainframes.

It's also an open system.

And it uses SNA and X.25 communications, so it can work together with other computers you may already own.

It comes with popular software tools, like SQL and MANTIS,™ and with C, COBOL, and BASIC languages.

And you have a choice of many ready-to-run solutions for business.

Now, do you read the industry press?

Well, according to them, you can buy a computer like the NCR 9800, with its advanced architecture, that'll be just as flexible and economical from another computer company.

In about 1990.

For information, call 1-800-CALL-NCR.

NCR 9800. The evolution of the mainframe.

NCR

© 1986 NCR Corporation   MANTIS is a trademark of Cincom Systems, Inc.

VTAM + NCP

NETSPY™ now offers more to MVS and MVS/XA sites interested in monitoring VTAM host and network response times.

Basic NETSPY
- Provides response time and traffic statistics per application and per terminal.
- Three levels of response time—last, worst and average.
- User service levels can be set by the use of a target parameter defined by application.
- Creates several SMF records and provides management reports.
- Makes no modification to either the MVS or VTAM code; is not release dependent.

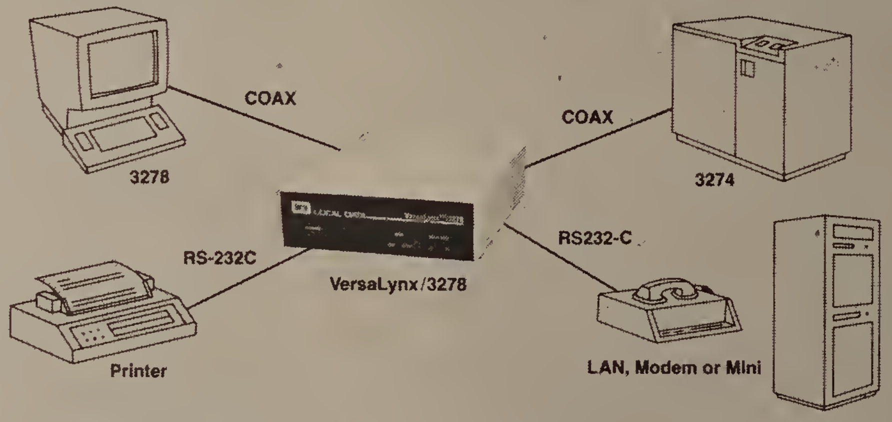
New NETSPY
- Provides response times for CICS (host and network) without the need to run CICS in a SNA definite response mode.
- The only product which provides on-line reports for TSO network times.
- Monitors all NCF resources—cycle and buffer usage; terminal, cluster and line error and traffic statistics.
- Support for all NCP's in the network. They can be defined or modified online, unlike other products which require predefined and preassembled code.

For a free 30-day trial call (312) 525-6400

—ChicagoSoft LTD 738 N. LaSalle St., Chicago, IL 60610

Break the IBM 3278 Coax Connection and Get Your Data Where It Needs to Go

VersaLynx™/3278 gives you something you didn't have before . . . asynchronous access for IBM coax terminals.



Use this RS232C interface as a gateway onto a LAN . . . access public databases served by packet switched networks . . . access data-only PBX . . . dialup the mainframe using low-cost async modems and a matching Local Data protocol converter at the host end . . . all with a keystroke command switching from IBM to ASCII mode. And for the best coax elimination solution, solve your connectivity problems using a VersaLynx with a companion Local Data product, InterLynx™/3278.

When operating in ASCII mode the VersaLynx™/3278 emulates a standard terminal, such as the VT-100/102, VT-52, ADM3A, Televideo 925, IBM 3101 or a custom configuration of the user's choice. Color and data rates up to 19.2K bps are supported.

Put a VersaLynx at each terminal or install a 16 channel rack at the controller site. For detailed information and systems assistance call (213) 320-7126. Canada (613) 748-9751. UK (0895) 56791.

Get more from your existing equipment. Break the coax connection with VersaLynx/3278. Prices start at $695 and OEM discounts are available.

VersaLynx™/3278 is certified for use on the Tymnet packet network.
IBM is a trademark of International Business Machines Corp.

"Your Lynx® to IBM"

LOCAL DATA
2771 TOLEDO STREET, TORRANCE, CA 90503 TLX 182518

Continued from page 86

nounced that they will co-label a version of Innovative Software's **Smart Software System** that will run under Microsoft Corp. MS-DOS and Unix.

AT&T will offer the package later this month for their Personal Computer 6300 and 7300 and later this year for the 6300+.

Smart Software System is a series of personal productivity applications. The conversion utility permits files and data to be exchanged between Unix and MS-DOS versions on PC 6300s or on 7300s equipped with DOS 73 coprocessors.

The Unix PC version will cost $895. The data base module costs $495; the word processing module costs $395.

AT&T Information Systems, 1 Speedwell Ave., Morristown, N.J. 07960.

Software languages

Wordtech Systems, Inc. has introduced **Hot C**, a C language compiler.

The basic Hot C package contains the compiler, a C language tutorial, a program editor and a symbolic debugger. Hot C is available for Microsoft Corp. MS-DOS, IBM PC-DOS and Digital Research, Inc. CPM/80 and CPM/86 operating systems.

The product costs $99.

Wordtech Systems, P.O. Box 1747, Orinda, Calif. 94563.

Software utilities

Publisher's Software Network has announced the **Text Indexer**, a program for the IBM Personal Computer said to scan any text file and create complete vocabulary or glossary word lists and an index showing the page numbers where words and topics are located.

The word list can be edited to remove unwanted entries and to add longer or multiple words. It can also be cross-referenced.

The program is priced at $239.

Publishers Software Network, 4314 Sage Circle, Salt Lake City, Utah 84124.

■

Cubicomp Corp. has introduced **True Color Paint**, a 16-bit true-color paint package for its Picture Maker personal computer-based, three-dimensional computer graphics system.

The package is said to enable users to display more than 65,000 colors within a single image. Colors can be blended and portions of an image can be tinted and shaded without affecting picture detail.

True Color Paint costs $3,950.

Cubicomp, 3165 Adeline St., Berkeley, Calif. 94703.

■

JEM Transform Technologies, Ltd. has announcd **Pendulum-RTM**, a product designed to allow personal computers to perform and improve upon the functions of hardware monitors used in measuring mainframe response time.

Pendulum-RTM allows a personal computer to monitor the response time of mainframe computers from companies such as IBM, Digital Equipment Corp. and Hewlett-Packard Co.

Pendulum-RTM costs $395.

JEM Transform Technologies, 14th Floor, 275 Slater St., Ottawa, Ont., Canada K1P 5H9.

■

Knipfty Software has announced **Tight Security Version 2.1**, an enhanced version of its compression and encryption software utility.

Tight Security is said to compress standard ASCII or text files up to 50% of their original size while encrypting the file.

Tight Security runs under IBM PC-DOS or Microsoft Corp. MS-DOS Version 2 or higher. It costs $129.95.

Knipfty Software, 24 Markwood Lane, East Northport, N.Y. 11731.

■

Software Development Factory has announced **Dbfind**, a multipur-

Continued on page 94

The Automated Data Center. We have seen the future and this is it.

CA-UNICENTER™
Totally integrated.
Totally automated - all the systems software you need to solve every data processing problem.

Automating data center operations, and increasing programming productivity, CA-UNICENTER is a complete system modular in design to perform the following functions:

- Scheduling
- Tape and Disk File Management
- Security
- Performance Management
- Job Accounting
- Print Management & Distribution
- Systems Utilities
- Resource Management
- Cobol Code Optimization
- Program Testing & Debugging
- Quality Assurance
- Application Development & Report Generation

Software security — a product to meet every data processing need.

The way is CA

CA-UNICENTER™
Automating support and service, online and on demand 24 hours a day.

A built-in service and support system provides a hard-disk PC to link your mainframe to the Computer Associates' mainframe Customer Service System. You get immediate response to all requests and immediate solutions to all problems plus tutorials and HELP covering every CA-UNICENTER component.

Relax and enjoy it — all the support and service you need automatically.

CA-UNICENTER™
Automated installation and continuous maintenance, too.

CA-UNICENTER also includes its own online, interactive, menu-driven installation and maintenance system. This user-friendly front end processor to IBM maintenance programs defines all product data sets, generates all required JCL and submits the job for execution...the easiest error-free installation you will ever experience. Maintenance is automated, too, with information and PTF's continuously available on tape or online through the Customer Service System.

Trouble free, worry free — everything's on automatic even installation and maintenance.

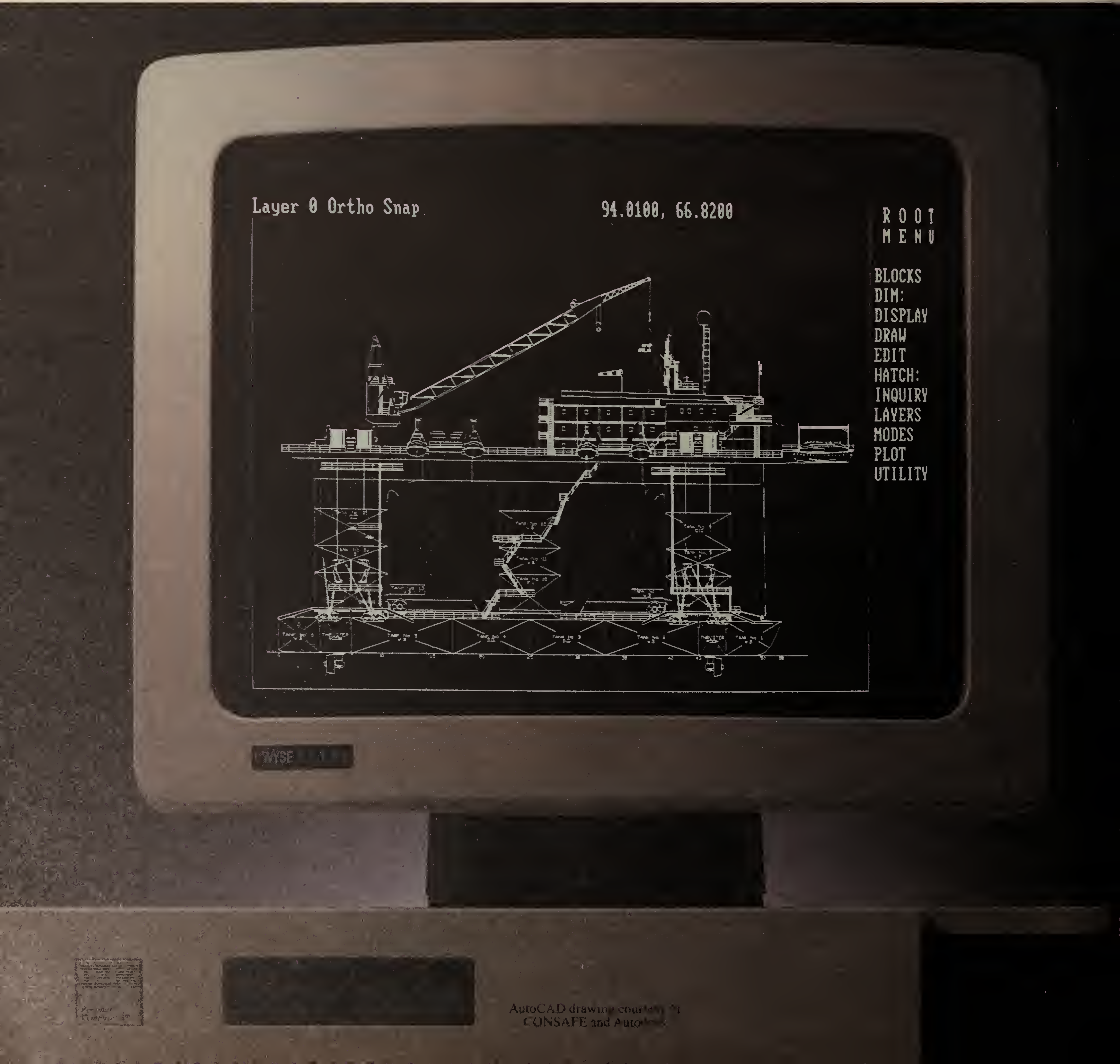
Soon there will be just two kinds of data centers—those with CA-UNICENTER and those struggling without. We have seen the future, and can deliver it complete today. Call 800-645-3003 and ask for Dana Williams to show you the way to the future. The way is CA.

COMPUTER ASSOCIATES
Software superior by design.

711 Stewart Avenue,
Garden City, N.Y. 11530-4787

© 1986 Computer Associates International, Inc.

We've resolved high resolution.



AutoCAD drawing courtesy of
CONSAFE and Autodesk

the high cost of

Crisp, almost startling, 1280 x 800 pixel clarity at a crisp, almost startling price. The new WY-700 graphics subsystem is the one monitor that lets you run both standard IBM software and high resolution applications for the IBM PC, PC/XT, PC-AT, the WYSEpc and other PC-compatibles.

$1595. Complete. Monitor and board.

Now you can realize the full potential of Computer-Aided Drafting and Design packages like Autodesk's AutoCAD and CalComp's Cadvance. The new graphics-based personal computing environments — Microsoft's MS Windows and Digital Research's G.E.M. — finally have the high resolution display they were made for. Desktop publishing packages get the screen treatment they deserve. And off-the-shelf IBM packages — Lotus 1-2-3, Microsoft's Flight Simulator — take on brilliant new dimensions.

If you're familiar with our full line of computer display products, none of this will surprise you. Nor will it surprise you that we now ship more terminals than anybody but IBM.* ASCII terminals, DEC-compatible ANSI terminals, IBM-compatible personal computers, color display terminals, high resolution graphics displays.

For more information about the WY-700 and our full line of computer display products, write or call today.

IBM PC, IBM PC/XT and IBM PC-AT are trademarks of International Business Machines Corporation. AutoCAD is a trademark of Autodesk, Inc. Cadvance is a trademark of CalComp. Lotus 1-2-3 is a trademark of Lotus Development Corporation. Flight Simulator and MS-Windows are trademarks of Microsoft Corporation. G.E.M. is a trademark of Digital Research Corporation.
*Dataquest 1985 mid-year terminal shipment update.

WYSE

Call 1-800-GET-WYSE

SEE US AT COMDEX BOOTH #1840

☐ **Yes, please send me detailed information on the WY-700 and the entire Wyse product line.**
☐ **I would like to see a demonstration of the WY-700.**

Name Title
Company Phone
Address
City State Zip

C-5/5/86

Mail to: Wyse Technology, Attention: Marcom Department,
3571 N. First Street, San Jose, California 95134.

© 1986 Wyse Technology

Continued from page 90

pose, professional-caliber programming tool for finding bugs in Ashton-Tate's Dbase command files.

Dbfind is said to list all syntax errors, generate a cross-module cross-reference and generate a single-module cross-reference. It supports either Dbase II or Dbase III.

Dbfind is priced at $99.

Software Development Factory, P.O. Box 1106, Hunt Valley, Md. 21030.

Software enhancements

Lifeboat Associates has released **Run/C Version 2**.

Run/C is a C language interpreter. Version 2 is said to include a fully integrated full screen editor, improved language implementation and performance and built-in graphics functions for IBM Personal Computers and compatibles.

Run/C is available for IBM Personal Computers, Personal Computer XTs, ATs and compatibles or other systems with Microsoft Corp. MS-DOS and ANSI terminal driver. It requires a minimum of 256K bytes of random-access memory.

Including a manual, Run/C Version 2 costs $120.

Lifeboat Associates, 55 S. Broadway, Tarrytown, N.Y. 10591.

■

Zylab Corp. has announced **Zyindex 2**, an enhanced version of its full text search software for IBM Personal Computers and compatibles.

Zyindex 2 is compatible with CD-ROM devices, write-once-read-many optical discs, certain local-area networks and 26 word processors, including IBM word processing protocols.

New features include select searching, the ability to display extended ASCII characters and an annotated mark-and-save capability.

Three versions are available. The standard version, which can search 500 files, costs $145; the Professional version, handling 5,000 files, costs $295; and the Plus version, handling 15,000 files, costs $695.

Zylab, 233 E. Erie St., Chicago, Ill. 60611.

■

Compupro has introduced **CP/M 68K Revision 1.3** an enhanced and updated version of Digital Research, Inc.'s operating system for Motorola, Inc. 68000-type processors.

New features include support for its Spuz 8 MHz slave processor, which allows 8-bit CP/M 80 programs to be run in a Motorola 68000 environment, support for interrupts with full type-ahead character input buffering, a full C compiler and a full Forth-83 language environment.

CP/M 68K Revision 1.3 costs $400. Licensed owners of previous CP/M 68K releases may upgrade for $125.

Compupro, 26538 Danti Court, Hayward, Calif. 94545.

Communications

Torus Systems, Inc. has enhanced its **Tapestry** local-area network software, **Remote Network Link** (RNL) and **Remote Access Gateway** (RAG) and introduced **Advanced Gateway Support** (AGS) and **Torus 3270 SNA Gateway**.

Tapestry Version 1.4, designed for use on Netbios-compatible network hardware or 3Com Corp. Etherlink hardware, offers enhanced external communications, improved compatibility with applications software and improved standard features. The Network Manager Pack costs $495, and the Workstation Pack costs $295.

RNL Version 1.4 provides Tapestry users remote access to the Tapestry network using ordinary phone lines and a personal computer equipped with a modem. RNL costs $295.

RAG configures a Tapestry network so that it may support RNL users. RAG costs $250 per network.

AGS extends the asynchronous communications capabilities of a Tapestry net to provide Digital Equipment Corp. VT100 emulation. It costs $795 per network.

The Torus 3270 SNA Gateway provides up to 32 Tapestry users concurrent access to an IBM mainframe computer. Prices range from $5,495 to $7,495.

Torus, Suite 105, 495 Seaport Court, Redwood City, Calif. 94063.

■

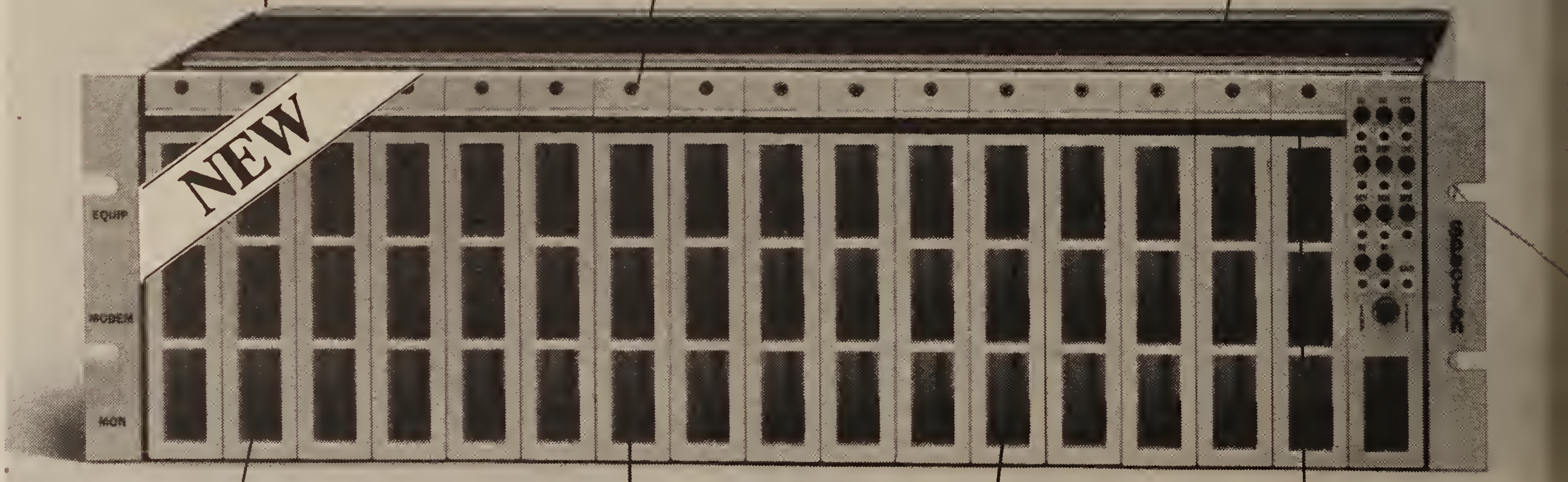
Standard Microsystems Corp. has introduced the **Arcnet-PC200** local-area net-

THE MANY FEATURES OF THE NEW DPU2403A EXPLAINED.

Smaller size is 4.5" shorter than standard depth to give more access space for cables in back.

Front-loading modules can be quickly and easily replaced.

Precision wave-soldered connections for improved reliability.



Full interface patching permits patching and monitoring for all 24 leads of an RS-232 circuit.

On-line monitoring/test access provides uninterrupted, transparent monitoring and interactive testing.

Hermetically sealed switch contacts give extremely high mean time between failure.

Three interface signals for quick digital reference of data line activity.

©1986 Northern Telecom

work controller board.

The board is said to allow users to configure a local-area network on IBM Personal Computers or compatibles.

The user can string or daisy chain up to eight network nodes off of a single line. It has a 2K-byte on-board data packet buffer, providing four pages of packet storage.

The Arcnet-PC200 costs $595.

Standard Microsystems, 35 Marcus Blvd., Hauppauge, N.Y. 11788.

Trisystems has introduced the **TC-5251 Twinax**, a twin-axial emulator. TC-5251 Twiunax is said to allow personal computers to communicate to a host through either an IBM 5250 control unit or direct connection to the host with a local attachment.

The TC-5251 Twinax reportedly can be used to communicate with an IBM System/34, 36 or 38.

The hardware and software provide all the features and functionality of an IBM 5251 display station.

According to the vendor, it supports IBM 5224, 5225 and 5256 printers.

It also supports host software as well as applications designed for the IBM 5251, 5291 and 5292 terminals.

The TC-5251 Twinax costs $895.

An optional 3180 keyboard is priced at $329.

Trisystems, 74 Northeastern Blvd., Nashua, N.H. 03062.

Prentice Corp. has announced the **Popcom 2400**, a 2,400 bit/sec. half-card modem for the IBM Personal Computer and compatibles.

The Popcom 2400 is a full-duplex modem featuring automatic adaptive equalization, which adjusts varying phone line conditions to assure accurate data transmission over common carrier lines.

Other features include autoanswer, autodial, automatic bit rate and parity selection, autospeed recognition on answer and automatic call monitoring under software control.

The Popcom 2400 costs $595.

Prentice, 266 Caspian Drive, Sunnyvale, Calif. 94088.

■

Advanced Computer Technology has announced the **ACT 2000 Telex** board for IBM Personal Computers and compatibles.

The board comes with software that allows users to receive and store incoming telex messages on the disk even while the computer is unattended or being used.

Other features include automatic transmission of previously prepared messages, destination checking and abbreviated dialing.

The ACT 2000 Telex board costs $495.

Advanced Computer Technology, Worcester-Providence Tnpk., Sutton, Mass. 01527.

■

Simware, Inc. has announced **Sim/RTM**, a personal computer-based application said to monitor system response across asynchronous X.25 and IBM 3270 networks.

Sim/RTM can operate in various network configurations including asynchronous networks and Systems Network Architecture and can be installed on both local and remote attached micros.

The software can emulate an IBM 3278 Model 2, Digital Equipment Corp. VT100 or a teletypewriter terminal and can be used to monitor response from any host system.

Sim/RTM costs $425.

Simware, Suite 100, 14 Concourse Gate, Nepean, Ont., Canada K2E 7S6.

■

Adax, Inc. has announced **Callsort**, a call accounting software package that runs on IBM Personal Computers and compatibles.

Callsort allows storage of call information from the phone system while the personal computer is being used for other applications.

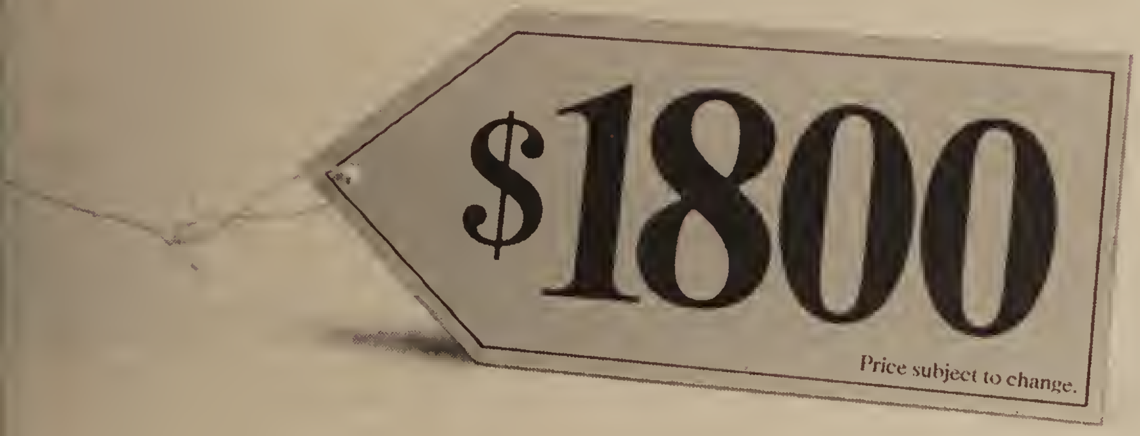
It generates standard reports including compilation by account or authorization code and provides a set of traffic reports. It also allows interfacing to other programs such as Lotus Development Corp.'s 1-2-3.

Callsort features a station directory package and a relative pricing module.

Callsort, capable of handling up to 200 extensions, costs $395. Callsort/1000, capable of handling up to 1,000 extensions, costs $895.

Adax, 6961 Peachtree Industrial Blvd., Norcross, Ga. 30071.

AND THE ONE FEATURE
THAT NEEDS NO EXPLANATION.



Call your Spectron representative or order direct.

SPECTRON

northern telecom

Spectron
8000 Lincoln Drive East
Marlton, NJ 08053

TO ORDER CALL YOUR
SPECTRON REPRESENTATIVE
OR (800) 222-0987 Dept. 609

IN NEW JERSEY CALL
(609) 596-4700 Dept. 609

Uptime

Provide 24 hour CICS access

CICS Dynamic File Allocation is a must for effective CICS scheduling. It is the gateway to non-stop, round-the-clock CICS systems. It eliminates batch update constraints. It guarantees bullet proof restarts. It allows you and your batch jobs to add and remove CICS files at will, without disrupting your user community. Site license $4,000.

Read JES Reports from CICS

Give your CICS terminals and PCs access to JES reports. Let end users (1) browse time critical reports, (2) control report distribution, and (3) schedule and submit their own jobs. The CICS Queue Command Facility (CQCF) is an efficient, cost effective tool for previewing and controlling JES II reports. Site license $3,000.

NETEC
Netec International, Inc.
P.O. Box 18538 • Dallas, TX 75218
214 324-2848 • Telex 80-4294

NEW PRODUCTS/MICROCOMPUTERS

Talbott Corp. has announced **Cometlink PC/XT** and **Cometlink PC/AT**, optional packages for its Comet PC/XT and PC/AT designed to allow these personal computers to double as batch terminals for uploading and downloading with IBM, Burroughs Corp., Digital Equipment Corp., Honeywell, Inc. as well as Sperry Corp. mainframes.

Cometlink PC/XT and PC/AT are single packages of hardware and software. They can be used for retrieving and manipulating data from the mainframe for word processing, spreadsheet and data base management applications, according to the vendor.

The Cometlink PC/XT is priced at $2,295. The Cometlink PC/AT costs $3,995.

Talbott, Suite 7, 2545 Chandler Ave., Las Vegas, Nev. 89120.

McDonnell Douglas Computer Systems Co. has announced **Reallink**, a personal computer connectivity software package.

The software is said to allow a Microsoft Corp. MS-DOS-equipped personal computer to be connected to a McDonnell Douglas Computer Systems Reality-based host minicomputer.

It allows PCs to run in terminal emulation mode. It also allows PCs to use the host as a file and print server.

The one-time license fee for Reallink is about $500 per personal computer.

McDonnell Douglas Computer Systems, 17481 Red Hill Ave., Irvine, Calif. 92714.

■

Alloy Computer Products, Inc. has introduced **NTNX**, software that enables the company's PC-Plus multiuser products to support applications software developed to run under Novell, Inc.'s Netware local-area network software.

NTNX supports all applications software for Novell local-area networks that employ Netware's logical record-locking calls. It runs transparently with Microsoft Corp. MS-DOS or IBM PC-DOS 3 or higher on the host personal computer, providing record- and file-locking controls. It also provides global random-access memory disk caching.

NTNX is priced at $395.

Alloy Computer Products, 100 Pennsylvania Ave., Framingham, Mass. 01701.

Data storage

EMC Corp. has announced a **series of memory upgrade options** featuring 256K bytes of random-access memory chips for Wang Laboratories, Inc. VS computers.

According to the vendor, the upgrades enable users to expand the memory capacity of their VS 85 systems up to 8M bytes and VS 100 systems to a maximum of 16M bytes.

The memory boards feature on/off switches, power lights and activity indicators to monitor board-level use.

The upgrades cost $6,000 per 1M byte.

EMC, 12 Mercer Road, Natick, Mass. 01760.

■

CMS, Inc. has announced the **Perfect 10 — CPII** 10M-byte hard disk for the Compaq Computer Corp. Portable II computer system.

The internal disk drive subsystem comes with formatting software and mounting hardware and cables and interfaces with the Portable II's built-in hard-disk controller. The four-head, 3½-in. drive is said to provide 85 msec average access time and replaces one of the floppy drives provided with the computer system.

The Perfect 10 — CPII costs $945.

CMS, 401-B W. Dyer Road, Santa Ana, Calif. 92707.

■

Sigma Designs, Inc. has announced the **Qic 36 Streaming Tape Controller**.

The Qic 36 card is said to use minimal power and fit in a single IBM Personal Computer XT short card slot.

According to the vendor, the con-

Continued on page 100

Rely on a chance meeting in a crowd this size?

NCC Daily! can help connect NCC attendees with your exhibit

Think about it. Hundreds of exhibits, and thousands of attendees. What are the chances that this June 16-19 every single NCC attendee — each a customer or potential customer — will stumble onto your booth?

You can guess fairly accurately that they're very slim. But you can improve those chances with the help of Computerworld's NCC Daily!

NCC Daily! gives advertisers the opportunity to reach show attendees. And reach it does. With a new edition published each day of the show, attendees value NCC Daily! It will summarize the prior day's events and preview upcoming happenings. Plus, it will help connect attendees with exhibitors and serve as an after-show-hours guide to Las Vegas.

So forget chance meetings and take advantage of this opportunity to direct NCC attendees to your exhibit. And take advantage of a great deal at the same time: order one insertion and you'll be advertising in all four issues of NCC Daily!

Call your Computerworld representative today to reserve your space in the NCC Daily! Or call Ed Marecki, Vice President/Sales at (617) 879-0700.

COMPUTERWORLD
Boston: (617) 879-0700 **New York:** (201) 967-1350 **Atlanta:** (404) 394-0758
Chicago: (312) 827-4433 **Dallas:** (214) 991-8366 **San Francisco:** (415) 421-7330
Los Angeles: (714) 261-1230

A PUBLICATION OF CW COMMUNICATIONS

Why is MODEL 204 the pacemaker for handling larger databases?

Heartbeat response.

When it comes to fast response to queries and updates, there's no database too large for Computer Corporation of America's MODEL 204.

In fact, against the competition, the bigger the database, the better we look. Here's an example:

A large travel agency with 900-plus on-line terminals uses MODEL 204 to maintain information on accommodations and transportation options around the world. In a benchmark simulating 1,000 users, 1,920 complex transactions were made in one minute on the travel agency's 2-gigabyte database. Response time? An average of 1.1 seconds.

The simple fact is, there is no relational-based DBMS that can store more, or handle it faster than MODEL 204, no matter how complex your queries get.

Like one large direct marketing firm that uses MODEL 204 for on-line real time sales tracking and analysis.

Their 10-gigabyte database contains 4,000 fields, of which 3,000 are keyed. Average response time to extremely complex queries of 3,000 or more transactions per minute? Less than 10 seconds. For less complex queries, response time drops to less than 2 seconds.

Heartbeat response. Another way of saying MODEL 204.

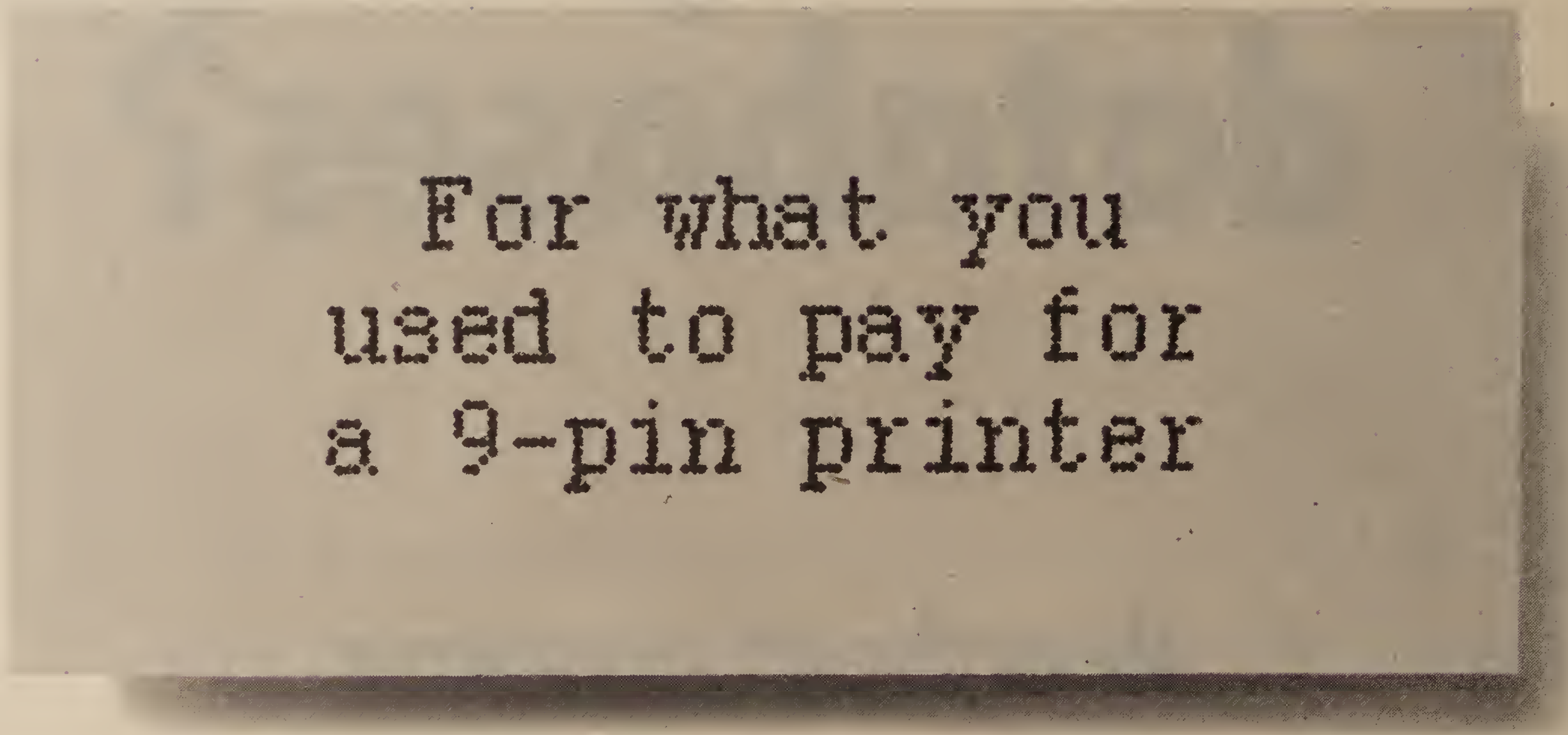
Get the facts. Write John Donnelly, V.P. Marketing, Computer Corporation of America, Four Cambridge Center, Cambridge, MA 02142. Or, call 1-800-258-4100, extension 603.

Computer Corporation of America

A Crowntek Company

Software innovators creating better ways to manage business.

PRINTERS'



For what you
used to pay for
a 9-pin printer

When you see our new Pinwriter™ P6, P7 series dot matrix printers, you'll think you're in a time warp.

These are the first 24-pin printers that list for as little as $699. Or about what you would have paid for an ordinary 9-pin printer a year ago.

Now, that's progress. Especially when you consider our new printers have an advanced 24-pin printhead. And print data at 216 characters per second and crisp, dense letter-quality at up to 65 cps. Which is as fast as most 9-pin printers turn out data quality.

Actually these new Pinwriter dot matrix printers surpass every other printer in their price range. In their combination of speed, graphics resolution, the number of built-in fonts and low noise level.

None of which will surprise you if you know NEC printers. Because nobody does more with 24-pin technology than NEC. In fact, we now have more 24-pin printer models than any other manufacturer.

C&C Computers and Communications

© 1986 NEC Corp.

PROGRESS.

now, you can buy
our fully-featured
24-pin printer.

So if you're looking for a printer that will do more and do it better, just progress o your NEC dealer and you'll get it for less than you imagined.

If you would like more details about our full line of 24-pin Pinwriter printers, all 1-800-343-4418 (in MA 617-264-8635). Or write: NEC Information Systems, Dept. 1610, 1414 Massachusetts Ave., Boxborough, MA 01719.

NEC PRINTERS. THEY ONLY STOP WHEN YOU WANT THEM TO.

NEC

NEC Information Systems, Inc.

Continued from page 96

troller gives users backup within single or multiple personal computer environments.

The Qic 36 Streaming Tape Controller is priced at $299.

Sigma Designs, 2023 O'Toole Ave., San Jose, Calif. 95131.

Printers/plotters/peripherals

Inmac Corp. has announced the **Universal Data Buffer**, designed as a holding tank for data sent to a printer or plotter.

The buffer is said to work with both serial and parallel interfaced equipment, leaving the computer free for other applications. Two peripherals may be buffered at once. Data may be sent to a plotter and a printer instantly without disconnecting cables.

The 64K-byte Universal Data Buffer costs $385, and the 256K-byte Universal Data Buffer costs $560.

Inmac, 2465 Augustine Drive, Santa Clara, Calif. 95054.

■

BDT Products, Inc. has announced two versions of the **Lettermate I/E** sheet feeder, both compatible with IBM's Quietwriter printer.

The sheet feeders can be added to the existing system. All parts snap together without any modification to either printer or IBM system.

The single-bin Lettermate I/E is priced at $295. An optional second bin may be purchased for $200. The dual-bin sheet feeder costs $495.

BDT Products, 17152 Armstrong Ave., Irvine, Calif. 92714.

■

Summagraphics Corp. has introduced a new version of its **Mactablet** graphics tablet for the Apple Computer, Inc. Macintosh.

The new version is said to provide 12 in. by 12 in. of active work area for all graphics needs, including professional drawings, freehand artwork and mapping. Work can appear on a one-to-one basis or be reduced on a direct scale to the screen size of the Macintosh. Drawings can be input freehand or traced through material up to ½-in. thick.

The Mactablet costs $549.

Summagraphics, 777 State St. Extension, Fairfield, Conn. 06430.

■

Juki Office Machine Corp. has announced the **Juki 6500** printer.

The Juki 6500 offers a maximum print speed of 60 char./sec., 10/12/15 pitch and proportional spacing. It comes standard with a 3K-byte buffer memory, expandable to 15K bytes. It provides special print features such as superscript, subscript, underlining, boldface, shadow printing and graphics capability.

The Juki 6500 is priced at $1,395.

Juki, 299 Market St., Saddle Brook, N.J. 07662.

■

Thomson Consumer Products Corp. has announced the **VM3801DA/DG** 15-in. monochrome monitor.

The monitor supports 132-col. displays and can transform color signals into 16 shades of amber or green. It operates at both 15.7 kHz and 18.4 kHz and can be used with either a monochrome or color graphics card.

The VM3801DG with a green display costs $199. The VM3801DA with an amber display costs $209.

Thomson has also added the ability to receive red-green-blue analog input signals and display up to 4,096 colors to its CM31481VI, CM36512VI, CM36432SI, CM36382SI and CM31311SI monitors at no cost.

Thomson, # 111, 5731 W. Slauson Ave., Culver City, Calif. 90230.

■

Philips Information Systems, Inc. has announced the **Philips Laserprinter**.

The laser printer was designed for the Philips 3004/3005 system but is said to be compatible with most personal computers. It offers seven fonts, including an additional eight-font cartridge, and can provide up to 400 custom-built fonts. It prints at speeds up to eight pages per minute.

The Philips Laserprinter is priced at $4,390.

Philips Information Systems, Suite 300, 15301 Dallas Pkwy., LB 35, Dallas, Texas 75248.

■

Syntest Corp. has announced the **SP-2010 Printer** designed for industrial applications.

The SP-2010 uses a 5-in. by 9-in. dot matrix impact print head driven by a fiberglass rubber belt. It provides an 80-col. print field and bidirectional printing at speeds up to 130 char./sec.

Internal electronics provide full feature control of font size, line and paper feed and dot-addressable graphics.

The SP-2010 costs $985.

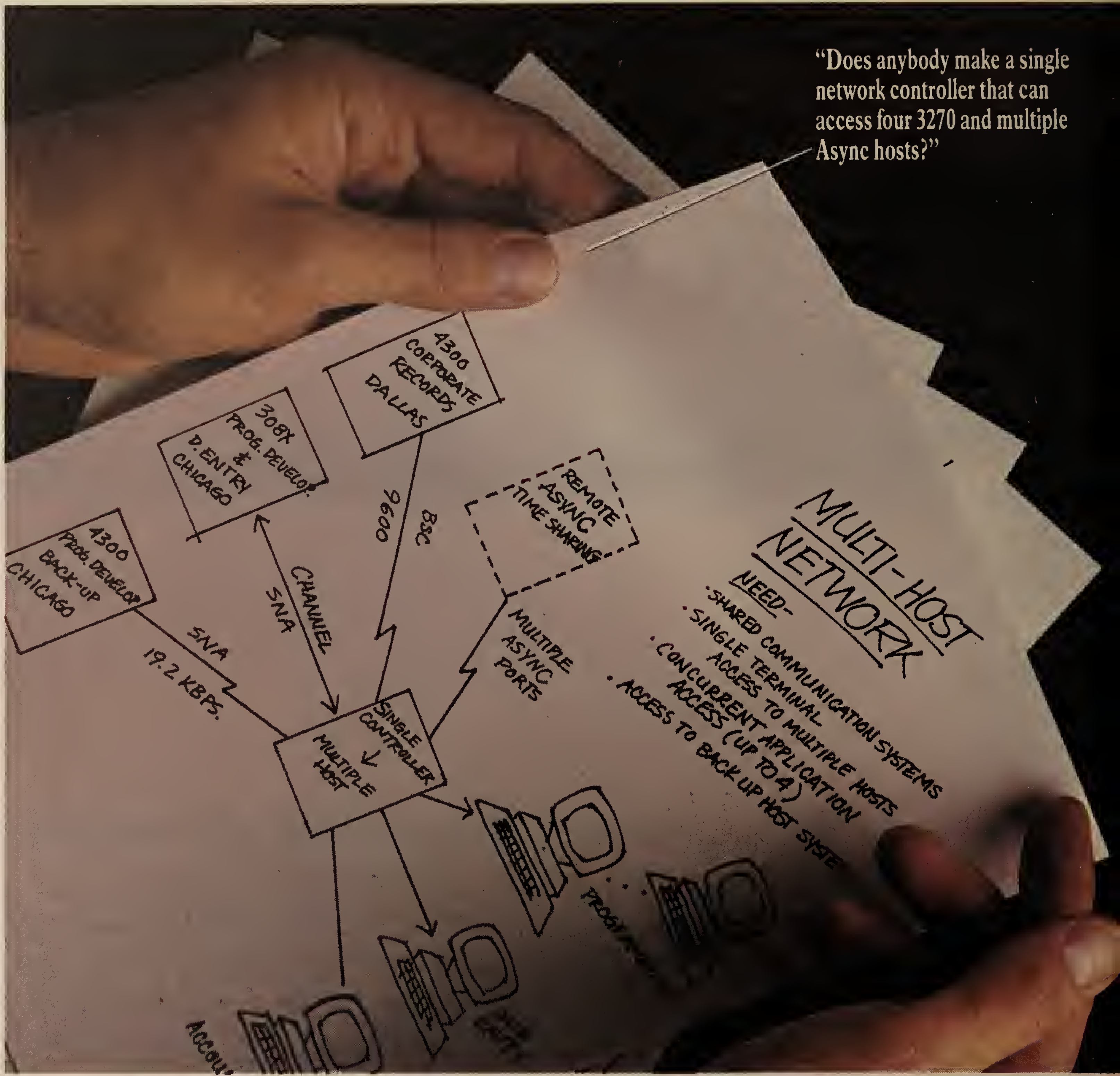
Syntest, 40 Locke Drive, Marlboro, Mass. 01752.

■

Summagraphics Corp. has unveiled an electronic computer mouse, called **Summamouse**, for use with the IBM Personal Computer and compatibles.

Summamouse features a driver and menu-selection system said to interface with software programs such as Lotus Develoment Corp.'s 1-2-3, Micropro International Corp.'s Wordstar and Microsoft Corp.'s Word. It has three action keys and operates on a 9-in. by 11-in. grid-patterned pad.

Other features include an onboard microprocessor, continual self-



"Does anybody make a single network controller that can access four 3270 and multiple Async hosts?"

Introducing multiple 3270 host access.

Multiple host access used to mean the expense of multiple controllers. The clutter of multiple displays. And the inconvenience of accessing multiple applications one at a time.

Our solution? Multi-host, multi-lingual network controllers that allow you to access up to four 3270 hosts and 32 Async hosts. And simultaneously view up to four "live" applications on a single Lee Data display.

Lee Data's "single system" approach to multiple host access is your passport to less

checking, built-in RS-232C board and solid-state optical technology, according to the vendor.

Summamouse costs $119.

Summagraphics, 777 State St. Extension, Fairfield, Conn. 06430.

■

BDT Products, Inc. has announced **Flipper**, a device designed to keep laser printer pages in sequential order.

Flipper is said to fit most laser printers, according to BDT Products. These printers include the Hewlett-Packard Co. Laserjet and Laserjet Plus and the Canon U.S.A. LBP-8.

According to the vendor, its bin holds 400 pages.

Flipper is priced at $200.

BDT Products, 17152 Armstrong Ave., Irvine, Calif. 92714.

■

Omnitronix, Inc. has announced the **Ramjet 256K-byte Print Buffer**.

The Ramjet comes with 256K bytes of buffer memory. It connects between the computer and the printer. It is available in either serial or parallel versions and is compatible with standard parallel or RS-232 printers. Features include a pause mode for using single sheets of paper and a power supply.

The Ramjet printer buffer costs $269.

Omnitronix, P.O. Box 43, Mercer Island, Wash. 98040.

■

Printer Products, a division of Capitol Circuits Corp., has announced the **Models S-600** and **S-610** slip and document flat-bed printers.

The printers feature up to 16K bytes of program memory, RS-422A interface and daisy-chain printer select for multiprinter environments. They print the 96-character ASCII set bidirectionally, 40-col. at 12 char./in. and at 3 line/sec. in three print modes.

Other features include top and bottom of form sensors, adjustable document stop, rapid line feed and self-test capabilities.

In quantities of 50, the S-600s cost $684 each and the S-610s cost $716 each.

Printer Products, 25 Denby Road, Boston, Mass. 02134.

■

Sigma Designs, Inc. has announced the **Model ATE-0000** expansion chassis for the IBM Personal Computer AT.

The ATE-0000 features from one to five programmable wait states, full direct memory access memory transfer, on-board erasable programmable read-only memory for configuration table storage and built-in test circuitry.

The chassis provides expansion slots for 10 add-on cards, either 16- or 8-bit, and can accommodate three half-height 5¼-in. peripherals. According to the vendor, ATE-0000 chassis can be linked to a single AT in daisy chain or star configuration.

The ATE-0000 is priced at $2,499.

Sigma Designs, 2023 O'Toole Ave., San Jose, Calif. 95131.

■

Printmanager, Inc. has introduced the **Printmanager Model PM6**, a six-port, printer-sharing system.

PM6 allows users to share lasers, plotters and other serial or parallel printers. One to five microcomputers can provide inputs to PM6's 64K-byte dynamically allocated buffer, which is upgradable to 1M byte.

Features include concurrent bidirectional input and output, 40 character start- and end-of-job messages, front panel selection for configuration, time-out, automatic form feed and end-of-job, handling of 300 to 19.2K bit/sec. rates and cascade mode.

PM6 costs $995.

Printmanager, 108 Water St., Watertown, Mass. 02172.

■

Mitsubishi Electronics America has introduced the **C-8652**, the **C-6679** and the **FG-6600**, three 15-in. high-resolution monitors for engineering computer-aided design and manufacturing workstations.

The C-8652 and the C-6679 offer 0.31mm dot pitch, self-convergence in-line gun, low power consumption and tap-changing power supply. The FG-6600 offers a 0.25mm dot pitch (0.31mm pitch optional), 1.28 by 1K-byte resolution, compared with 1,024 by 780 lines for the other two models.

The FG-6600, C-8652 and C-6679 cost $2,995, $2,495 and $2,195, respectively.

Mitsubishi, 991 Knox St., Torrance, Calif. 90502.

Board-level devices

Verticom, Inc. has announced the **H-16**, a 1,024 by 768 pixel graphics controller.

The H-16 was designed for personal computer-based computer-aided design and drafting applications utilizing the IBM Personal Computer AT and compatibles. It is said to emulate the IBM Enhanced Graphics Adapter, Color Graphics Adapter and Monochrome Display Adapter.

The controller has more than 1.3M bytes of display memory. It offers 16 displayable colors from a palette of 4,096.

The H-16 is priced at about $2,995.

Verticom, 545 Weddell Drive, Sunnyvale, Calif. 94089.

■

Paradise Systems, Inc. has introduced the **Hi-Res Graphics Card**, a video display adapter for the IBM Personal Computer family and compatibles.

The card is said to provide the

Continued on page 102

"Lee Data does. It's right here, in their new Passport."
PASSPORT
Solutions For Enhanced Networking And Local Processing
LEE DATA CORPORATION

Plus Async access in a "single system."

clutter, less expense, and easier access to multiple applications.

To learn more about 3270/Async network controllers and other solutions for your growing information network, get the new Lee Data Passport.

For your FREE copy, call 1-800-LEE-DATA. In Minnesota, (612) 828-0300. In Canada, 1-800-387-9758.

LEE DATA CORPORATION

©1986 Lee Data Corporation

Continued from page 101

maximum resolution and color from standard IBM color and monochrome monitors. It is compatible with the IBM Color Graphics Adapter, the IBM Monochrome Adapter, the Hercules Computer Technology, Inc. Graphics Adapter and the Plantronics Colorplus cards.

The Hi-Res Graphics Card costs $299.

Paradise Systems, 217 E. Grand Ave., South San Francisco, Calif. 94080.

■

STB Systems, Inc. has announced the **Chauffeur HT**, a video display adapter for IBM Personal Computer-compatible systems.

The Chauffeur HT is said to combine the ability to display standard color graphics adapter software on IBM-compatible monochrome monitors without any drivers with Hercules Computer Technology monochrome graphics and Tseng Labs 132 character compatibility.

The Chauffeur HT runs all color graphics adapter and monochrome printer adapter software on standard red-green-blue color monitors.

The Chauffeur HT costs $349.

STB Systems, Suite 125, 601 N. Glenville, Richardson, Texas 75081.

■

Star Gate Technologies, Inc. has introduced the **MRB-2000**, an expanded memory board for the IBM Personal Computer AT and compatibles.

The board is compatible with multiuser, multitasking operating systems and with systems running at 8 MHz. It is available with zero kilobytes, 512K bytes, 1M byte, 1.5M bytes and 2M bytes of memory.

Prices range from $282 to $872.

Star Gate Technologies, Suite 109, 33800 Curtis Blvd., Eastlake, Ohio 44094.

■

Agile has unveiled **Klone**, a replacement for Digital Communications Associates, Inc.'s Irma hardware.

Klone allows the attachment of an IBM Personal Computer or compatible and an IBM 3270 controller or Display Printer Adapter through an IBM 3270 coax. It features 8K bytes of random-access and display memory for emulating 3278 and 3279 Models 2, 3 and 4 screen formats.

Klone costs $595.

Agile, 4041 Pike Lane, Concord, Calif. 94520.

■

Sigma Designs, Inc. has introduced the **TurboEGA**, **Turbo400** and **Fastcache286** accelerator cards for the IBM Personal Computer and Personal Computer XT.

The Fastcache286 card includes 4K-byte cache memory, optional Intel Corp. 80287 coprocessor and hardware reset switch.

The TurboEGA was designed for general business applications, and the Turbo400 provides high-resolution graphics capabilities.

The Fastcache286, the TurboEGA and the Turbo400 cost $649, $899 and $949 respectively.

Sigma Designs, 2023 O'Toole Ave., San Jose, Calif. 95131.

COMMUNICATIONS

Controllers

Micom Systems, Inc. has introduced its **Micro4900 Digital Transceivers** said to automatically adapt to standard AT&T Dataphone Digital Service link speeds of 2,400, 4.8K and 9.6K bit/sec.

The transceivers combine Data Service Units with Channel Service Units to yield Integrated Service Units. They can operate in point-to-pont and multipoint applications and can support synchronous inputs. They are available as stand-alone packages and as card modules.

Prices range from $645 to $725. A central site chassis, capable of holding a mix of up to 16 digital transceivers, leased-line modems and dial back-up units costs $995.

Micom Systems, P.O. Box 8100, 4100 Los Angeles Ave., Simi Valley, Calif. 93062.

Voice/data communications

VMX; Inc. has added several call-transfer features to its **Voice Message Exchange** system.

The enhancements include the ability to dial 0 to reach the operator before or after leaving a voice message when using either the call answering or message desk feature. Also, when a user accesses the voice mailbox he can now dial 001 to receive a dial tone, dial an extension number and initiate a transfer to another extension.

The Voice Message Exchange system ranges in price from $50,000 for a low-end, 100-user, four-port system to $500,000 for a high-end, 8,000-user, 170-port system.

VMX, 17217 Waterview Pkwy., Dallas, Texas 75252.

■

GTE Communications Systems Corp. has enhanced its **GTE Starlog** digital voice and data communication system.

The system is said to switch simultaneous voice and asynchronous or synchronous data at rates of 19.2K bit/sec. and enable users to have customized data bases for every station location.

New features include a complete lodging feature package, key telephone features such as one-touch operation for line or intercom, enhanced data options and expanded line capacity for up to 80 data sta-

YOU DON'T HAVE A COBOL PROGRAM SO PATCHED AND TANGLED IT CAN'T BE STRUCTURED AUTOMATICALLY.

Until recently, there were only two ways to deal with the patched-up, hand-me-down, unstructured COBOL programs that consume up to 70 percent of your company's software effort.

You could continue to live with the old programs, patching and mending as best you could. Or you could scrap the programs, at enormous cost and disruption, in favor of an entirely new system.

But now there is a third alternative. COBOL structuring. The advantages of this alternative are enormous. Among them, the ability to reduce maintenance costs by 50 percent by more effectively using your programming resources.

The technological leader in COBOL structuring is Language Technology, Inc. In fact, of the very few companies who claim to have a COBOL structuring solution at all, Language Technology is the only one with a system, called RECODER,™ that is fully automatic. The others automate only a portion of the structuring task, leaving the really tough parts to be done manually, over a period of weeks or more, by trained experts, who, because they are human, will make mistakes.

BENEFITS OF STRUCTURING

Source: T. Capers Jones	Unstructured	Completely Structured
Original program size (lines)	50,000	50,000
New code added (lines)	3,000	3,000
Programmer time (months)	12.5	6.5
Total cost	$75,000	$39,000
Defects at delivery	38	4
Stabilization period (weeks)	21	2
Meantime to failure (hours)	1.5	28

The benefits of structuring are illustrated in this example, representing the costs of adding 3000 lines of new code to an unstructured program of 50,000 lines, as compared to adding the same number of lines to the same size structured program.

Based on proprietary language processing techniques and pioneering research in graph theory, RECODER has reduced the tremendously complex mathematics involved to a provably correct solution so complete that it does not force you to accept its own style of structured code. You can select the level of nesting, type of operators, complexity of expressions, formatting style, representation of procedures, and many other features that might be required by your own in-house standards.

RECODER, available as a service or by license, can automatically structure thousands of lines of COBOL in minutes, without the necessity of adding

tions according to the vendor.

A typical 64-station, mid-range, fully equipped system is priced from $250 to $275 per line.

GTE Communications, 2500 W. Utopia Road, Phoenix, Ariz. 85027.

Protocol converters

Micom Systems, Inc. has announced the **Micro7881** and **Micro7887** protocol converters for users of the IBM 3270 Information Display System.

The Micro7881 lets asynchronous CRT terminals and personal computers function as IBM 3278 display stations. The Micro7887 lets users replace IBM 3287 printers with any of a variety of ASCII printers with parallel or serial interfaces.

Both protocol converters attach to IBM 3270 control units or integrated display adapters using IBM Type A coaxial cable.

The Micro7881 costs $1,095. The Micro7887 costs $1,495.

Micom, P.O. Box 8100, 4100 Los Angeles Ave., Simi Valley, Calif. 93062.

■

Dynatech Packet Technology, Inc. (Dynapac) has added the **PBX.25 Gateway** to its X.25 Gateway product line.

The PBX.25 Gateway is said to meet the requirements of Northern Telecom, Inc.'s Meridian private branch exchange system. It allows users to link PBXs to form a private network. It offers a way to connect RS-422 PBX ports to a CCITT X.25 packet network or to communications equipment supporting X.25.

The PBX.25 Gateway is available in a 16-port unit for $7,240.

Dynapac, 6464 General Green Way, Alexandria, Va. 22312.

Software

The IMS Group has announced **IMS Telephone Software**, said to enable users to manage and control telephone systems' design, operation and costs.

The software operates from a single data base. It is composed of modules including equipment manager, maintenance manager, cable manager, call accounting manager and message center manager.

IMS Telephone Software is written in the C language. It runs under Microsoft Corp.'s MS-DOS on any IBM Personal Computer compatible. According to the vendor, AT&T Unix System V multiuser capability will be available in June.

IMS Telephone Software is priced at $10,000.

The IMS Group, 219 W. Rhapsody, San Antonio, Texas 78216.

Multiplexers/modems

Flexstar Corp. has introduced the **FS232 Multiplexer**, said to be able to link computers, terminals and printers using the RS-232C serial port of any IBM Personal Computer or compatible.

The unit can multiplex up to 32 devices or demultiplex 32 to one. It simultaneously transmits and receives data and control signals over the host single-port interface serial path with a cable length up to 100 ft. The RS-232C protocol supports commands of request to send, clear to send and transmit.

The 32-port FS232 costs $3,500.

Flexstar, 606 Valley Way, Milpitas, Calif. 95035.

■

Anderson Jacobson, Inc. has announced the **AJ 1411-LD** 14.4K bit/sec. multiport leased-line modem.

The modem is said to provide automatic fail-safe data transfer with automatic dial backup capability when leased lines fail. It also features a built-in time division multiplexer that enables up to six channels to transmit data simultaneously.

The AJ 1411-LD costs $4,995.

Anderson Jacobson, 521 Charcot Ave., San Jose, Calif. 95131.

Test equipment

Hard Engineering, Inc. has enhanced its **Bytebug 645**, a portable data line analyzer that incorporates a 672-char. LCD for full screen display.

The Bytebug 645 is said to operate at continuous synchronous speeds up to 256K bit/sec. half duplex, 128K bit/sec. full duplex or 38.4K bit/sec. asynchronous. The new feature, called Autofigure, enables the 645 to interpret communication line protocols to eliminate the need for entering setup parameters.

The Bytebug 645 comes with X.25 Level 3 analysis and Systems Network Architecture Level 2 analysis.

The analyzer costs $4,500.

Hard Engineering, P.O. Box 4185, Huntsville, Ala. 35802.

■

Fotec, Inc. has introduced the **Model S370** LED fiber-optic test source.

The S370 has both long and short wavelength LEDs for testing dual-wavelength systems and cabling. It has two microlensed LED sources at 820 and 1,300 nanometers. For testing connectorized cables, over 40 different adapters are available. When used with a dual-wavelength fiber-optic power meter, it allows the testing of any multimode cable for computer systems.

The S370 is priced at $1,600.

Fotec, The Schrafft Center, Box 246, 529 Main St., Boston, Mass. 02129.

Auxiliary equipment

Electro Standards Laboratory, Inc. has introduced its **Model 8652-D** and **Model 9106** EIA RS-232 A, B, C,

Continued on page 104

consultants or any new people to your staff or of requiring any new skills of the people already on it. And, RECODER can do it with a cost effectiveness that will allow it to pay for itself within a year.

Because you hear a lot of promises from a lot of software companies, we can understand if you are skeptical about what we say we can do. That's why we want you to know that RECODER has been cutting its teeth on real world COBOL for four years now, successfully structuring millions of lines for such forward-looking companies as Federal Express, GTE, Phillips Petroleum, Mellon Bank and TRW. That's also why we want to give you the opportunity to put us to the test.

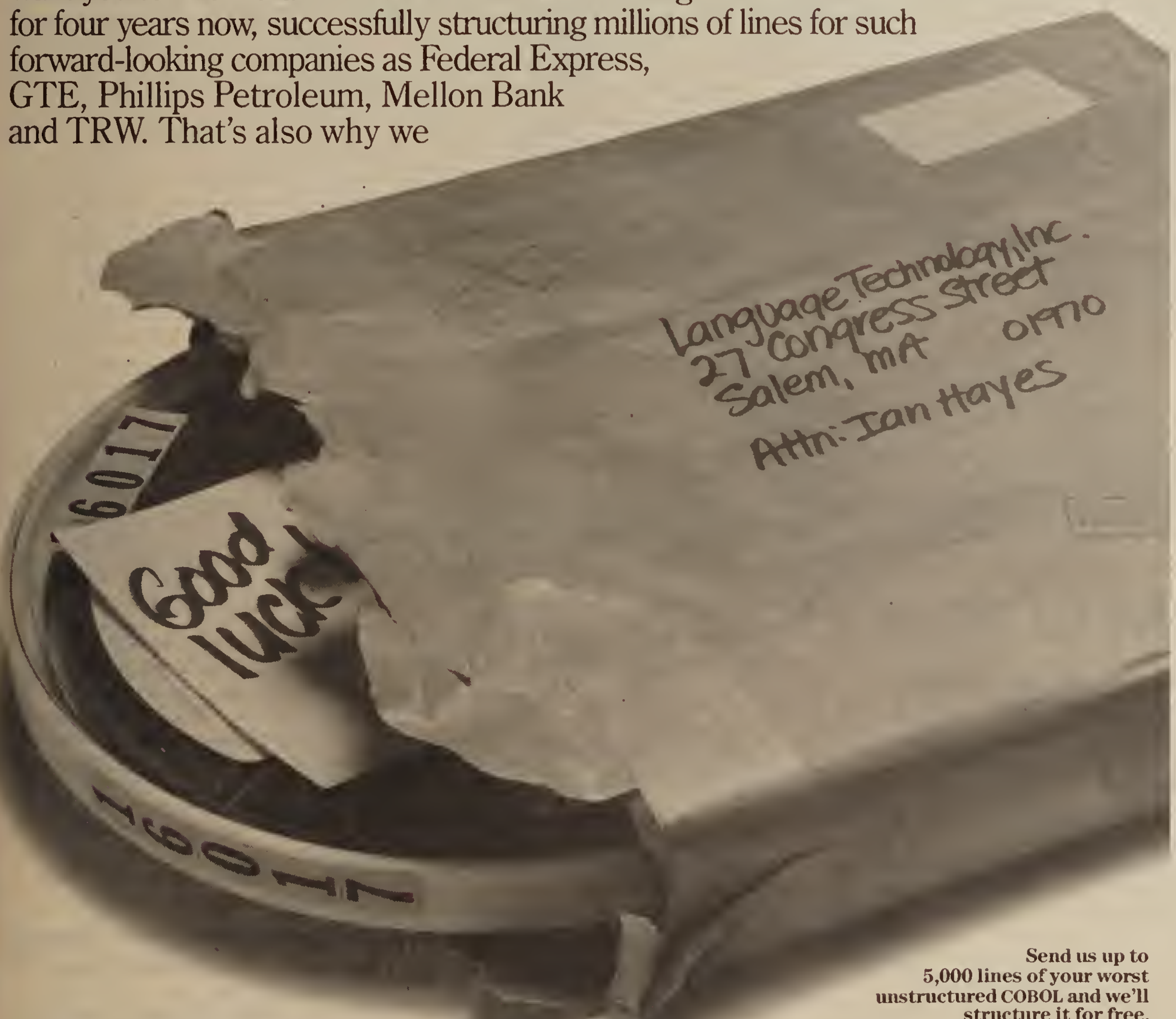
Send us up to 5,000 lines of your worst unstructured COBOL, maybe even that awful program written by the person who occupied your seat just before you did, and we'll structure it with RECODER for free.

To find out how, call us today at 1-800-RECODER or (617) 741-1507 or write Language Technology, Inc., 27 Congress Street, Salem, MA 01970.

Send us up to 5,000 lines of your worst unstructured COBOL and we'll structure it for free.

LANGUAGE TECHNOLOGY

THE LEADER IN REDUCING SOFTWARE MAINTENANCE COSTS.



Continued from page 103

D, E, F switches.

The switches were designed to provide the capability to share one computer port among six peripherals or one peripheral among six minis, micros or mainframes. Both models switch all signals at the EIA RS-232 interface.

The Model 8652-D is priced at $395. The Model 9106 costs $495.

Electro Standards Laboratory, P.O. Box 9144, Providence, R.I. 02940.

SYSTEMS & PERIPHERALS

Processors

Sigma Information Systems has introduced the **SA-H124** stand-alone Q-bus system chassis for the Digital Equipment Corp. LSI-11.

The cabinet is said to fit under desktops. It has an eight-row, quad-wide Q-bus backplane that contains 16 dual slots with 22-bit addressing and Q-bus termination.

The SA-H124 is priced at $1,905.

Sigma Information Systems, 3401 E. La Palma Ave., Anaheim, Calif. 92806.

■

Pinnacle Systems, Inc. has announced the **Pinnacle XL020** and **XL020+**, two multiuser supermicrocomputers that incorporate the 32-bit Motorola, Inc. 68020 central processor with dual 68000 I/O processors.

The desktop XL020 supports up to 40 users. It features 2M bytes of random-access memory (RAM), expandable to 4M bytes, with hard-disk capacity from 72M to 290M bytes.

The XL020+ features 4M bytes of RAM, expandable to 16M bytes. Hard-disk capacity ranges from 119M to 860M bytes. It can support 80 users.

Both systems have eight serial ports and two parallel ports. The XL020 costs from $21,000, and the XL020+ costs from $29,900.

Pinnacle Systems, 10355 Brockwood Road, Dallas, Texas 75238.

Data storage

Hewlett-Packard Co. has announced the **HP 7933XP** and the **HP 7935XP**, enhanced versions of its high-end HP 7933H and HP 7935H disk drives.

The enhancement is in the form of a 1M-byte semiconductor memory cache placed in the controller of the 404M-byte drives.

According to the vendor, the controller cache stores the most active data, reducing the number of reads from the disk surface.

The HP 7933XP costs $27,200, and the HP 7935XP costs $29,800. A field upgrade kit costs $3,500.

Hewlett-Packard, 1820 Embarcadero Road, Palo Alto, Calif. 94303.

Power supplies

RTE Deltec Corp. has introduced the **TPC series** of three-phase power conditioners in the 10-kVA to 45-kVA power range.

The models are stepping controllers that offer 50Hz or 60Hz operation. Features include one-cycle response time, surge-current capability to 100% for one cycle, the capability of supporting 100% unbalanced load at output and automatic disconnect in the event of an output overload or phase failure.

The TPC series models are priced starting at $8,595.

RTE Deltec, 2727 Kurtz St., San Diego, Calif. 92110.

Components

Intel Corp. has announced the **ISBC 186/530, ISBC 186/100, ISBC 186/410** and **ISBC Mem/601** single-board products for Multibus II systems.

The 186/530 board is a communications engine that allows multiprocessing systems to connect to Ethernet local-area networks. The 186/100 CPU board uses an 8M-byte 80186 processor.

The 186/410 serial communications computer provides up to 10 channels of serial communications for host communications or direct terminal I/O. The Mem/601 board is a universal-site, nonvolatile memory expansion board.

Prices are $1,995, $2,595, $2,395 and $850, respectively.

Intel, 5200 N.E. Elam, Young Pkwy., Hillsboro, Ore. 97123.

Auxiliary equipment

Marvel Metal Products Co. has introduced a **laser printer cabinet** said to provide a station for a laser printer as well as related supplies.

It has a slide-out drawer with a divided section for font cartridges and an adjustable shelf for storing preloaded paper cassettes.

The laser printer cabinet is priced at $279.

Marvel Metal Products, 3843 W. 43rd St., Chicago, Ill. 60632.

PRICE REDUCTIONS

Thoughtware, Inc. has reduced the price of its **Management Training Library** software system.

The Library is an integrated and interactive training system consisting of 13 programs said to assess individual management skills, organizational effectiveness and personal style interaction.

The programs run on the IBM Personal Computer, Personal Computer XT and AT.

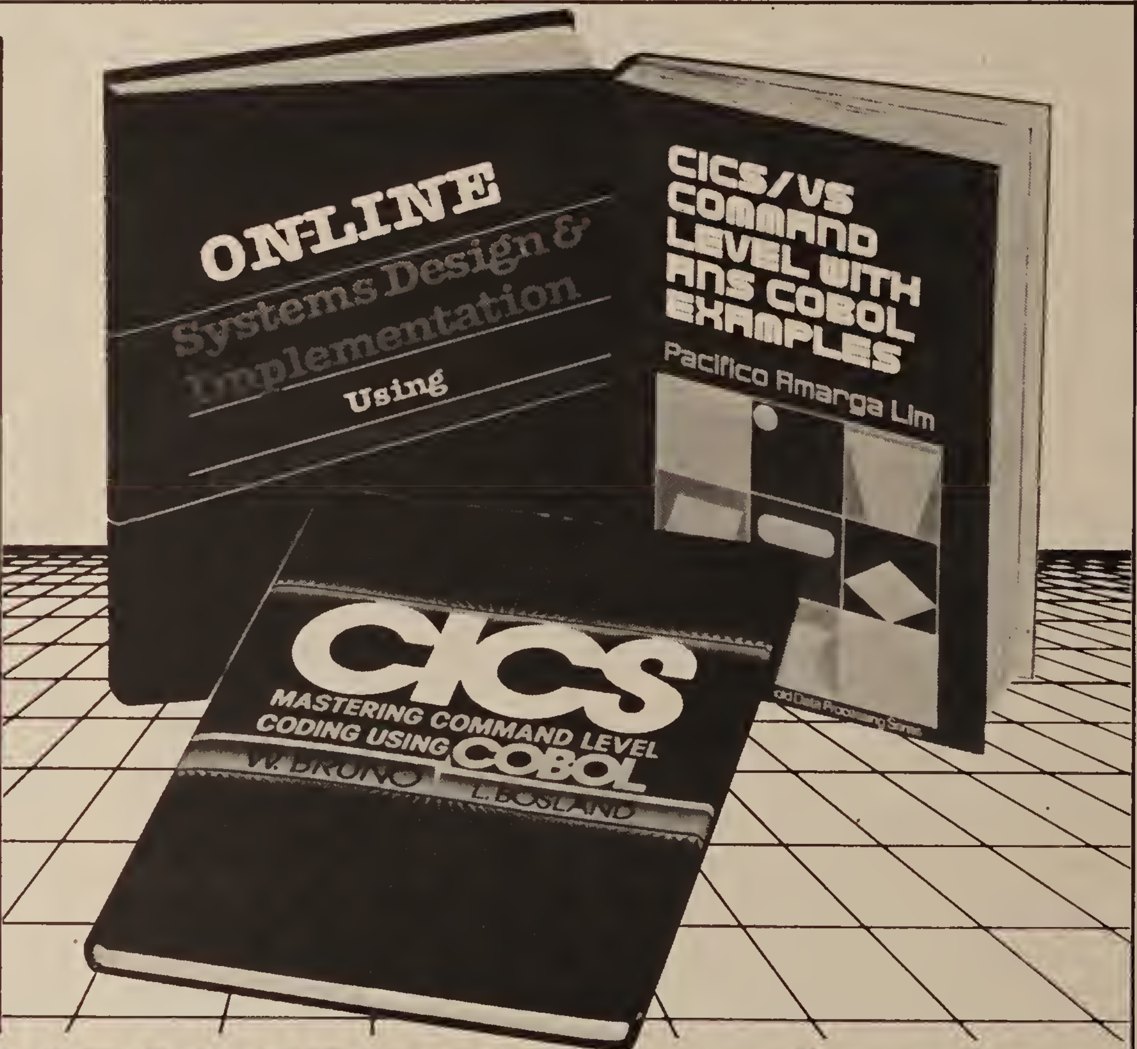
The system is now priced at $999. Each program is available for $99 individually.

Thoughtware, Suite 1000A, 2699 S. Bayshore Drive, Coconut Grove, Fla. 33133.

For the computer professional, these three books applicable to IBM mainframes are a must. But like so many fine books on computer-related subjects—hardware, software, languages, database management, artificial intelligence, and personal computing—they could be costly. That's why you need The Library of Computer and Information Sciences.

We're the oldest, largest book club especially designed for computer professionals. In the incredibly fast-moving world of data processing, where up-to-the-moment knowledge is essential, we make it easy to keep totally informed on all areas of the information sciences. What's more, our selections offer you discounts of up to 30% or more off publishers' prices.

And we'll prove it. Join us now, agree to buy three more books within the next 12 months from us, all at handsome discounts, and you can own this IBM CICS set, worth $84.85, for just $3.95. Here's what you'll get:


ON-LINE
Systems Design & Implementation
Using
CICS/VS COMMAND LEVEL WITH ANS COBOL EXAMPLES
Pacifico Amarga Lim
CICS
MASTERING COMMAND LEVEL CODING USING COBOL
W. BRUNO
L. BOSLAND

INPUT: 3 IBM COBOL Data books worth $84.85

OUTLAY: just $3.95

You simply agree to buy 3 more books—at handsome discounts—within the next 12 months.

On-Line Systems Design and Implementation Using COBOL and Command Level CICS

Charles J. Kacmar's example-filled guide shows you how CICS is structured and how transactions are initiated, controlled and terminated. It's written from the viewpoint of a working designer who needs to be able to quickly evaluate the impact of different design decisions upon the application. Publisher's Price: $26.95.

CICS: Mastering Command Level Coding Using COBOL

William G. Bruno and Lois Bosland spell out how transactions are initiated, the role of internal CICS tables and work areas, how to handle abend processing and exceptional conditions, how to format screens using BMS, how to handle files, reading and browsing, adding and deleting, file pointers, and much more. Publisher's Price: $24.95.

CICS/VS Command Level with ANS COBOL Examples

Pacifico A. Lim's practical handbook shows how to design and code in a CICS environment. All the tools and techniques necessary for on-line teleprocessing concepts, screen layout, BMS mapping, program components, the linkage section, pseudoconversational coding, and much more. Publisher's Price: $32.95.

MEMBERSHIP BENEFITS • In addition to getting the CICS Programmer's Library for only $3.95 when you join, you keep saving substantially on the books you buy. • Also, you will immediately become eligible to participate in our Bonus Book Plan, with savings of up to 70% off the publishers' prices. • At 3–4 week intervals (16 times per year), you will receive the Library of Computer and Information Sciences News, describing the coming Main Selection and Alternate Selections, together with a dated reply card. • If you want the Main Selection, do nothing, and it will be sent to you automatically. • If you prefer another selection, or no book at all, simply indicate your choice on the card and return it by the date specified. • You will have at least 10 days to decide. If, because of late mail delivery of the News, you should receive a book you do not want, we guarantee return postage.

Library of Computer and Information Sciences Delran, New Jersey 08075

Please accept my application for trial membership and send me the CICS Programmer's Library (00689) billing me only $3.95, plus shipping and handling. I agree to purchase at least three additional Selections or Alternates over the next 12 months. Savings range up to 30% and occasionally even more. My membership is cancelable any time after I buy these three additional books. A shipping and handling charge is added to all shipments.

No-Risk Guarantee: If I am not satisfied—for any reason—I may return the CICS Programmer's Library within 10 days. My membership will be canceled, and I will owe nothing.

Name____________________

Name of Firm____________________

(If you want subscription sent to your office)

Address____________________ Apt ______

City__________ State__________ Zip__________

(Books purchased for professional purposes are a tax-deductible expense. Offer good in Continental U.S. and Canada only. Prices slightly higher in Canada.)

Computerworld 5/5/86 7-DF7

At 19,200 bps, speed alone can be blinding.

In the race to claim the fastest high speed modem, many modem companies advocate basing your buying decision on one thing: speed. What's happened, unfortunately, is that modem purchasers are getting so caught up in modem speed they're losing sight of the most important consideration.

Modem performance. So before you rush into a high speed modem, ask yourself two simple questions. What level of performance do you really want out of a modem which operates at 19,200 bps? How much more efficient will it make you?

The answers to these two questions will lead you to one modem.

Introducing the Codex 2680.

It's the thoroughbred of 19.2 kbps modems. The superior performance of the Codex 2680 is achieved by utilizing enhanced 64-state 8-dimensional Trellis Coded Modulation (64 x 8 TCM), enabling Codex to position error-correcting data in a smaller signal constellation, thereby making it less susceptible to line disturbances.

In actual use the Codex 2680 delivers 99.9% error free data over more than 90% of standard 3002 D1 conditioned lines at 19.2 kbps.

The big payoff.

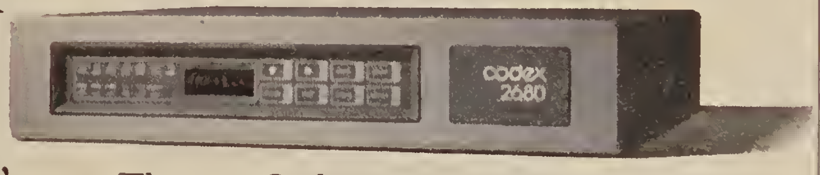
Speeds of 19.2 kbps allow you to realize dramatic increases in efficiency and productivity. Without increasing expenses or staff resources. And these savings add up. Fast. With its standard 2-channel multiplexer, you can eliminate extra lines. For example, by combining two separate 9600 bps circuits into one leased-line at 19,200 bps typical savings for a New York to LA link are greater than $24,000 per year.*

What's more, the Codex 2680 offers complete network management capabilities for monitoring and fault isolation. It can operate independently or with your central site Codex network management system, to ensure greater network availability. In short, it's a modem that's really a true network system resource.

It's all perfectly clear.

Another important feature of the Codex 2680 is the fact that it is shipping right now. Not tomorrow. Now.

If you still have questions or would like a product demonstration, simply call **1-800-426-1212, ext. 227.** Or write Codex Corporation, Dept. 707-227, 20 Cabot Blvd., Mansfield, MA 02048.



The new Codex 2680 19,200 bps high speed modem.

The quicker you do it, the faster you'll be achieving what you really want out of a high speed modem. Performance.

codex

MOTOROLA

---

*Based on average installation and leasing charges for 3002 D1 circuits as of 10/85.

Motorola and Ⓜ are trademarks of Motorola Inc.
© 1985 Codex Corporation Codex is a registered trademark of Codex Corporation

THE ADVANTAGES OF HAVING THE PC

AT&T's PC 6300 PLUS: MULTI-TALENTED TO HANDLE MULTI-TASKS

Our newest PC displays a most distinct personality. It can do so many things and do them all extremely well.

Take, for instance, its uncommon speed. Unlike most other PCs, the PC 6300 PLUS works as fast as you do, so you never have to wait for it to catch up with you.

AT&T offers another clear-cut reason for selecting the PC 6300 PLUS: Its highly defined, easy-to-read screen resolution. Compared to the IBM PC AT,* the PC 6300 PLUS text and graphics are four times sharper. Whether you're working on sales charts or preparing presentations, getting a better picture helps communicate the big picture.

Our non-glare screen and tilt-and-swivel monitor allow you to work comfortably on the PC 6300 PLUS for hours at a time. Its sleek design enables this unusually powerful PC to fit easily on your desk. Again, next to all the major competitors, AT&T's PC takes up 40% less desk space.

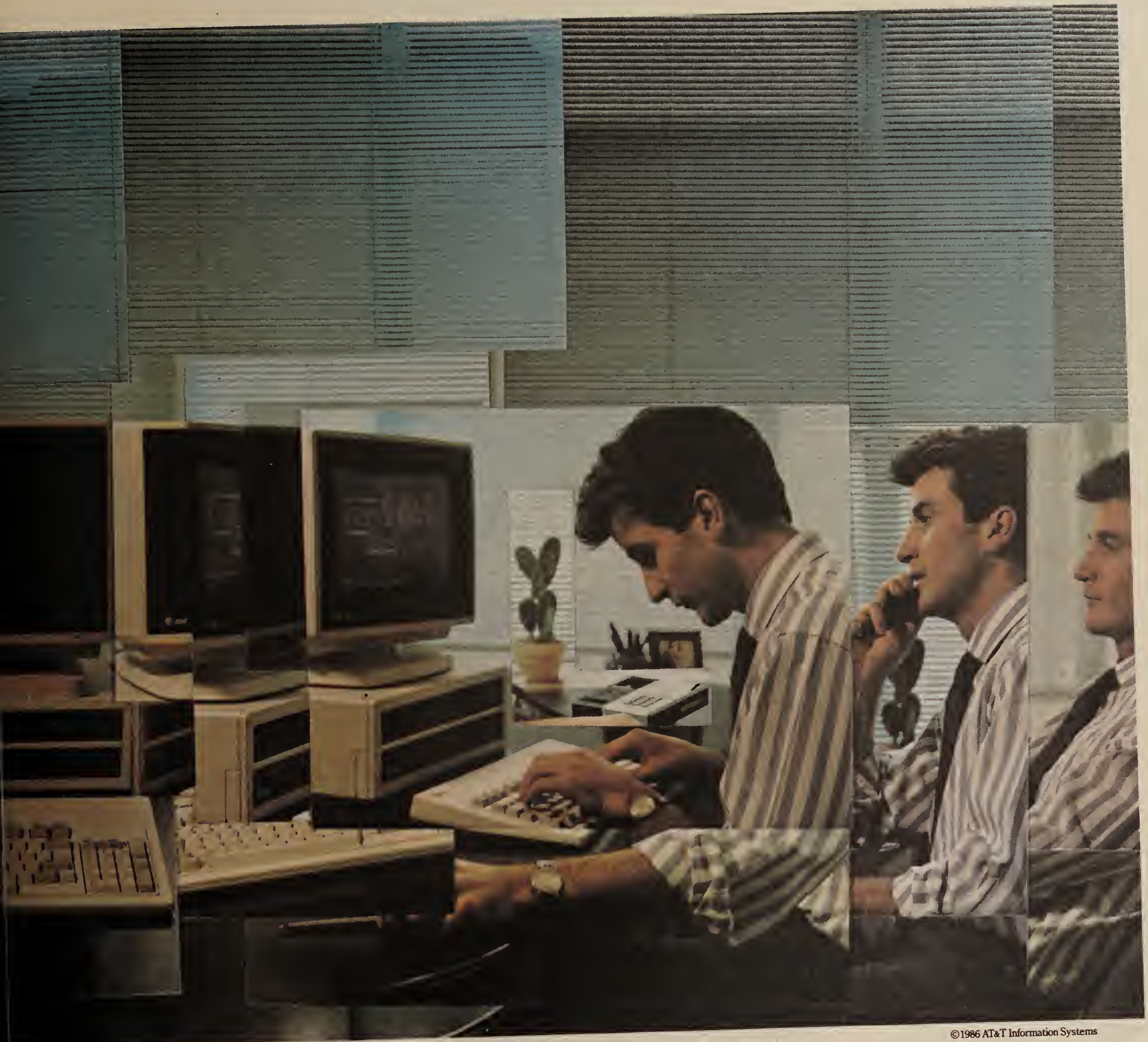
PERSONALITY PLUS

There's more to AT&T's PC 6300 PLUS than sheer power and comfortable design.

There's a side no one's ever seen before. It's a special feature on the PC 6300 PLUS called Simul-Task which lets you do things on a desktop computer that other PCs only hope to do someday: it works the way you work.

Say, for example, you are working on a spreadsheet and need the latest stock quotes. Simul-Task enables you to call up the new information and return to your original program in a fraction of the time it would normally take. You'll soon be able to activate Simul-Task.

When you are ready to protect your work, the PC 6300 PLUS enables you to eas-



©1986 AT&T Information Systems

WITH THE MULTIPLE PERSONALITY.

ily make backup files while you continue on with other things. You can also schedule programs to run while you're away from your machine, so when you return, all the information will be waiting for you. The PC 6300 PLUS even affords you the convenience of sending and receiving electronic mail in the background while you run another program in the foreground.

THE COMPUTERS WITH THE FUTURE BUILT IN

The combination of high performance and unique features makes the AT&T PC 6300 PLUS the personification of PC investment protection. Without abandoning the software you already own, you are bringing some extraordinary new capabilities to your desktop.

That's what you'd expect from AT&T, the one company whose computers are designed for the future.

All the more reason why the PC 6300 PLUS may very well be suited to your personality.

For more information call your AT&T Information Systems Account Executive, visit an authorized AT&T dealer or call 1 800 247-1212.

*IBM and AT are registered trademarks of International Business Machines Corp.

AT&T
The right choice.

CALENDAR

WEEK OF MAY 11

MAY 11-14, NEW ORLEANS — **Association for Systems Management (ASM) 1986 Annual Systems Conference.** Contact: Richard B. McCaffrey, ASM, 24587 Bagley Road, Cleveland, Ohio 44138.

MAY 12-14, DENVER — **Optical Storage '86.** Contact: Cartlidge & Associates, Inc., Suite M-259, 1101 S. Winchester Blvd., San Jose, Calif. 95128.

MAY 12-14, MINNEAPOLIS — **PC FAB Expo/Trade Show.** Contact: Shows Department, PMS Industries, 1790 Hembree Road, Alpharetta, Ga. 30201.

MAY 14, WALTHAM, MASS. — **Algorithms and Their Practical Importance to the DP Professional.** Contact: Deborah Dupee, Association for Women in Computing Program Director, Suite 21, 66 Chiswick Road, Brookline, Mass. 02146.

WEEK OF MAY 18

MAY 19, ANNAPOLIS, MD. — **Mapics Users' Conference.** Contact: Salem Corp., 1654 Poplar Lane, Annapolis, Md. 21401.

MAY 19-21, HILTON HEAD, S.C. — **Audit Managers Symposium VII.** Contact: MIS Training Institute, Inc., 4 Brewster Road, Framingham, Mass. 01701.

MAY 19-21, SAN FRANCISCO — **Hammer Forum West: Change and Continuity in End-User Computing.** Contact: Michael Hammer, Hammer and Co., Five Cambridge Center, Cambridge, Mass. 02142.

MAY 19-21, SAN FRANCISCO — **ID Expo, The Conference and Exposition of Automatic Identification Systems and Keyless Data Entry.** Contact: Expocon Management Associates, 3695 Post Road, Southport, Conn. 06490.

MAY 19-22, PHILADELPHIA — **Lasers in Manufacturing: SPOT '86 Conference and Exhibits.** Contact: Kathleen Warren, Technical Activities Department, Society of Manufacturing Engineers, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.

MAY 20-22, ATLANTA — **Eastern Telecommunications Showcase.** Contact: Agnes M. Pavel, Program Director, U.S. Telecommunications Suppliers Association, Suite 1618, 333 N. Michigan Ave., Chicago, Ill. 60601.

MAY 20-23, ORLANDO, FLA. — **Techex '86 Americas: The Annual World Fair for Technology Exchange.** Contact: Anne E. Klenner, Dr. Dvorkovitz & Associates, P.O. Box 1748, Ormond Beach, Fla. 32075.

MAY 21-23, NEW YORK — **New York University Symposium on Information Technology and Management Strategy.** Contact: Kenneth C. Laudon, Graduate School of Business Administration, New York University, 90 Trinity Place, New York, N.Y. 10006.

WEEK OF MAY 25

MAY 28-29, WASHINGTON, D.C. — **Systems/34, 36 and 38 Users Show.** Contact: Andrew Wahtera, The Producers, 360 Merrimack St., Lawrence, Mass. 01843.

MAY 29-30, SAN FRANCISCO — **Unix In Focus.** Contact: International Data Corp., 3350 W. Bayshore Road, Palo Alto, Calif. 94303.

MAY 29-31, BLACKSBURG, VA. — **Personal Computer Interfacing For Scientific Instrument Automation.** Contact: Linda Leffel, Virginia Polytechnic Institute and State University, Blacksburg, Va. 24061.

MAY 30-JUNE 2, ATLANTA — **Society of Telecommunications Consultants Spring Conference.** Contact: STC Headquarters, Suite 1410, One Rockefeller Plaza, New York, N.Y. 10020.

WEEK OF JUNE 1

JUNE 2-5, DETROIT — **Vision '86 — Applied Machine Vision Conference and Exposition.** Contact: Vision '86 Public Relations, Machine Vision Association of the Society of Manufacturing Engineers, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.

JUNE 2-5, NASSAU BAY, TEXAS — **International Symposium on Ada Programming Language Applications for Space Station Development.** Contact: University of Houston — Clear Lake, 2700 Bay Area Blvd., Houston, Texas 77058.

JUNE 4-6, SAN DIEGO — **1986 National Educational Computing Conference.** Contact: Susan M. Zgliczynski, National Educational Computing Conference 1986, School of Education, University of San Diego, Alcala Park, San Diego, Calif. 92110.

JUNE 7, BEIJING — **China-Didacta '86: The International Trade Fair for Educational Equipment.** Contact: Swiss Industries Fair, Secretariat China Didacta '86, P.O. Box CH-4021, Basel, Switzerland.

WEEK OF JUNE 8

JUNE 9-11, MYRTLE BEACH, S.C. — **The Association of Small Computer Users in Education 19th Annual Summer Conference.** Contact: Jack Cundiff, Horry-Georgetown Technical College, Conway, S.C. 29526.

JUNE 9-11, NORCROSS, GA. — **Time and Motion Study Fundamentals.** Contact: Institute of Industrial Engineers Registrar, 25 Technology Park/Atlanta, Norcross, Ga. 30092.

JUNE 9-12, BOSTON — **Network Management/Technical Control**

Now playing on

Forte PJ™ The original soft-loaded 3278/79 emulator for PCs. A powerful core product with IBM® compatible file transfer support. You can add mainframe graphics, 3270PC and more features as you need them.

Forte 3270PC™ A smarter desk on a disk. The power of IBM's 3270 PC with a simple software upgrade of the Forte PJ. You can "hot key" between host and mainframe windows, and do up to four concurrent file transfers.

ForteGraph (for IRMA)™ A whole new look at the mainframe for IRMA™ users. You get all the features of ForteGraph, plus compatibility with ForteNet host file transfer software.

ForteLink SNA™ The link that puts a remote 3274 controller in your PC and allows up to five concurrent host sessions. Like Forte PJ, it's menu-driven and supports ForteNet file transfers. And it's Topview™ compatible.

Conference and Exposition. Contact: CW/Conference Management Group, 375 Cochituate Road, Framingham, Mass. 01701.

JUNE 9-12, CHICAGO — **Com Lease Spring.** Contact: Show Management, 3825-I S. George Mason Drive, Falls Church, Va. 22041.

JUNE 9-13, SAN DIEGO — **MUMPS Users' Group 15th Annual Meeting.** Contact: MUMPS Users' Group, Suite 510, 4321 Hartwick Road, College Park, Md. 20740.

JUNE 10-13, ATLANTA — **Summer 1986 Unix Conference and Exhibition.** Contact: The Usenix Association Conference Office, P.O. Box 385, Sunset Beach, Calif. 90742.

WEEK OF JUNE 15

JUNE 16-20, CAMBRIDGE, MASS. — **Managing Information Technology: New Responsibilities in a Changing Environment.** Contact: Center for Information Systems Research, Sloan School of Management, MIT, E40-193, 77 Massachusetts Ave., Cambridge, Mass. 02139.

JUNE 17-18, PLYMOUTH, MICH. — **Robotic End Effectors: Design and Applications Seminar.** Contact: Mary Dombrowski, Special Programs Division, Robotics International of the Society of Manufacturing Engineers, One SME Drive, P.O. Box 930, Dearborn, Mich. 48121.

JUNE 17-19, ATLANTIC CITY — **Plas-Tech '86.** Contact: Delia Associates, P.O. Box 338, Delia Marketing Communications Center, Whitehouse, N.J. 08888.

JUNE 18-20, TOKYO — **Marketing Opportunities Seminar.** Contact: Agnes M. Pavel, Program Director, U.S. Telecommunications Suppliers Association, Suite 1618, 333 N. Michigan Ave., Chicago, Ill. 60601.

WEEK OF JUNE 22

JUNE 22-27, PHILADELPHIA — **Management Information Systems for Strategic Advantage.** Contact: The Registrar, Office of Executive Education, 200 Vance Hall, The Wharton School of the University of Pennsylvania, Philadelphia, Pa. 19104.

JUNE 23-25, ALBUQUERQUE, N.M. — **Integrated Fiber-Optic Technology Training.** Contact: Linda Castle, Optoelectronic System Consultants, P.O. Box 35525, Albuquerque, N.M. 87176.

JUNE 23-26, BOSTON — **ATE East '86.** Contact: Registrar, Morgan-Grampian Expositions Group, 1050 Commonwealth Ave., Boston, Mass. 02215.

JUNE 23-27, AMSTERDAM — **Fourth Annual European Fiber-Optic Communications and Local-Area Networks Exposition.** Contact: Cheryl MacDonald, Information Gatekeepers, 214 Harvard Ave., Boston, Mass. 02134.

JUNE 23-27, CHICAGO — **A/E/C Systems '86: The Computer and Management Show for the Design and Construction Industry.** Contact: Conference Director, A/E/C Systems '86, P.O. Box 11318, Newington, Conn. 06111.

JUNE 25-26, COATESVILLE, PA. — **Chester County Expo '86: CAD/CAM Conference from Micro to Mini.** Contact: Lee Smith, Central Chester County Vocational Technical School, 1635 E. Lincoln Highway, Coatesville, Pa. 19320.

WEEK OF JUNE 29

JULY 2-3, LAS VEGAS — **Full Meeting of the Design Automation Standards Subcommittee.** Contact: Ron Waxman, DASS Co-chairman, IBM FSD, 9500 Godwin Drive, Manassas, Va. 22110.

WEEK OF JULY 27

JULY 28-30, RENO, NEV. — **1986 Summer Computer Simulation Conference.** Contact: The Society for Computer Simulation, P.O. .Box 17900, San Diego, Calif. 92117:

WEEK OF AUGUST 10

AUGUST 11-14, SNOWMASS, COLO. — **AM/FM International Ninth Annual Conference.** Contact: AM/FM International, Suite 820, 8775 E. Orchard Road, Englewood, Colo. 80111.

WEEK OF AUGUST 17

AUGUST 18-22, DALLAS — **Thirteenth Annual Conference on Computer Graphics and Interactive Techniques.** Contact: SIGGRAPH '86, Conference Management, Smith, Bucklin & Associates, Inc., 111 E. Wacker Drive, Chicago, Ill. 60601.

AUGUST 19-21, PHILADELPHIA — **Second Annual Physical and Electronic Security Symposium and Exposition.** Contact: Michael C. Otten, Booz, Allen and Hamilton, Inc., 4330 East-West Highway, Bethesda, Md. 20814.

WEEK OF AUGUST 24

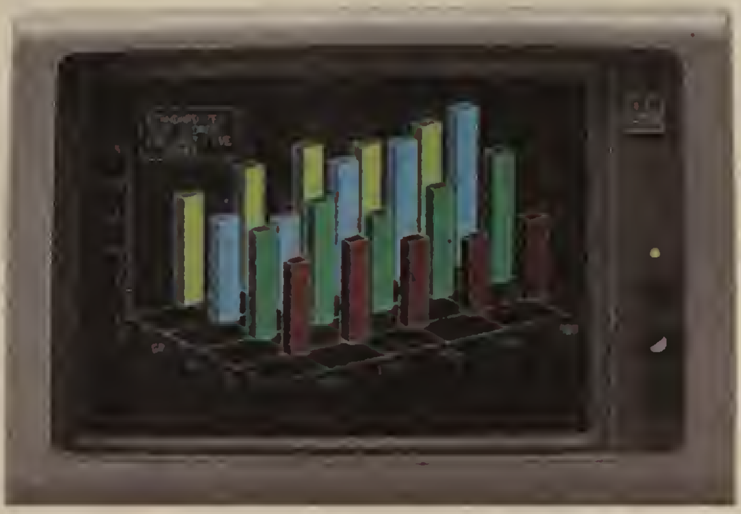
AUGUST 26-28, SAN MATEO, CALIF. — **Interconnect '86.** Contact: Agnes M. Pavel, Program Director, U.S. Telecommunications Suppliers Association, Suite 1618, 333 N. Michigan Ave., Chicago, Ill. 60601.

WEEK OF SEPTEMBER 7

SEPTEMBER 9-12, ANTWERP, BELGIUM — **Second European Simulation Congress.** Contact: The Society for Computer Simulation, c/o Ghislain C. Vansteenkiste, Professor of Engineering, University of Ghent, Coupure Links 653, B-9000 Ghent, Belgium.

the Forte Network:

ForteNet™ CMS-TSO host file transfer software or menu-driven transfers of binary and text files n either direction. ForteNet is considered one of the industry's fastest software packages. It's also compatible with Wang, TI, DEC Pro™ and Telex links to IBM mainframes.



ForteGraph™ The first link that put IBM mainframe graphics on the IBM PC. Add it to Forte PJ without using an extra slot. Save and print graphics with your PC. Dip into GDDM,¹ SAS/GRAPH® and TELLAGRAF™ software. Totally compatible with IBM's host file transfer.

ForteCall TTY™ provides 3278/79 emulation or remote ASCII terminals. Simply dial into your PC which is connected to the mainframe via PJ. **FortePrint™** Software for PJ that turns your PC printer into an IBM 3287 printer.

A major graphics series, rated APA. 3270PC enhancements. Twinax. LAN Gateways. And more. All supported by the Forte network. All attuned to IBM's office systems strategy. For complete information, just call toll-free.

FORTE
COMMUNICATIONS

THE FORCE IN MICRO TO MAINFRAME

2205 Fortune Drive, San Jose, CA 95131 • Telex 275973
TOLL-FREE HOTLINE (800) 233-3278

orte and all associated product names are trademarks of Forte Communications, Inc. © 1985. IBM is a registered trademark of International Business Machines. DEC Pro is a trademark of Digital Equipment Corporation. ¹GDDM is a product of ternational Business Machines. SAS/GRAPH is a registered trademark of SAS Institute, Inc. TELLAGRAF is a trademark of Integrated Software Systems Corporation. IRMA is a trademark of Digital Communications Associates, Inc. TopView is a trademark International Business Machines.

Announcing APS for '86

Here's what's new for '86:

APS/EXPRESS	"Fill-in-the-blank" facility that generates simple application systems without requiring *any* coding.
APS/PC	Stand-alone PC workstation support for the design, prototyping and development of application systems. Magnifies APS productivity through the rapid, consistent response of the IBM PC.
APS/PC-LINK	Software link that facilitates APS "upload and download" communications between your mainframe and PC workstations.
APS/DB2	In addition to IMS and CICS support, APS users can optionally target applications to the DB2 environment through SQL.

And there's more…

VM	APS VM support facilitates the development of systems in VM that target to the MVS production environment.
VS COBOL II	APS COBOL II support allows users to generate shared re-entrant code using IBM's VS COBOL II compiler.
MVS/XA	APS takes full advantage of MVS/XA, and runs above the 16-meg line. APS MVS/XA support doubles the number of concurrent APS users in an XA Development Center environment.

Productivity for IMS, DB2 and CICS Users

Maybe you're familiar with APS—the Application Productivity System for your IBM Development Center. APS is a family of ISPF-based productivity products that enables your development staff to design, prototype and implement batch and online applications in a fraction of the traditional time and cost.

You may know that the APS family of products incorporates screen and application "painting," prototyping capabilities, and procedural and macro language support.

You may also know that the APS products are incorporated in an open architecture integrated on three important levels: the products are integrated with each other; with IBM's strategic software; and throughout the complete systems development lifecycle for cumulative productivity savings.

What you may *not* be familiar with are the exciting new enhancements that we've just added to APS for '86. So if you're interested in increasing your Development Center productivity, let us tell you more about APS for '86. Call us at **800-638-8703** and ask to schedule a:

- **Day-At-SAGE**—A one-day session at our facilities, complete with "hands-on" workshop. You will meet with our technical support staff to gain the complete product knowledge you'll need to make an informed decision.
- **Presentation**—A product demonstration at your location, geared to your particular productivity needs, that will give your key evaluators a comprehensive look at the capabilities of APS for '86.
- **Seminar**—A half-day seminar at a location near you that will provide you and your staff with an understanding of the features and benefits of APS for '86.

Whatever choice you make, there's no obligation, just an opportunity to learn more about the most comprehensive application productivity system available—APS for '86.

SAGE SYSTEMS, INC.

3200 Monroe Street • Rockville, MD 20852 • 301/231-8686 • 800-638-8703

IBM PC is a registered trademark of the
International Business Machines Corporation.

The case for fault tolerant transaction processing.

Ask anyone who is seriously involved in OLTP (on-line transaction processing) what worries them most and they'll give you one consistent answer, "system failure." That's when the domino theory goes to work. Because when the computer goes down, your whole operation goes down with it.

Now ask them what they look for most in an OLTP computer and, again, they'll answer with amazing consistency, "affordable power."

So, it should come as no surprise that when people learn Stratus makes the most complete, cost-effective, on-line system featuring hardware-based fault tolerance, they respond, intelligently enough, by buying it.

What is surprising is the fact that Stratus computers are priced lower than many others that offer less power and no fault tolerant architecture.

If you're seriously looking at OLTP systems, do what so many others have already done – pick Stratus. Because we make the most reliable computer for cost-effective transaction processing in the world.

Let us show you how a Stratus fault tolerant transaction processing computer can keep your operation up and running profitably full time. Call our Marketing Services Dept. at 800-752-4826. In MA 800-221-6555.

Stratus®

The most cost effective fault tolerant
OLTP computer you can buy.

Stratus Computer Inc., Marlboro, MA 01752

COMPUTER INDUSTRY

Section begins on page 142

GEISCO changes tack, angles toward network applications

Company bailing out of remote services mart, president reaffirms

By Mitch Betts

ROCKVILLE, Md. — General Electric Information Services Co. (GEISCO) executives have a strategy for rebounding from the dismal state of the remote computing services market, but it is a strategy that may take four or five years to pay off.

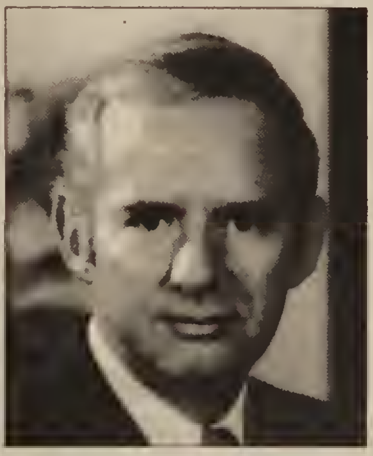
Since the collapse of the time-sharing and remote services markets in the late 1970s, the General Electric Co. division has been redirecting its business toward providing value-added network applications, such as electronic document interchange (EDI) and automated logistics and payments systems, for specific industries [CW, June 10, 1985].

Walter W. Williams, GEISCO's president, told *Computerworld* in a rare interview that the moves are designed to make strategic use of the firm's worldwide telecommunications network to enter high-growth markets and to avoid the pitfalls of GEISCO's traditional time-sharing business.

Painfully aware that the time-sharing business died because the falling cost of hardware enabled corporations to take data processing in-house, Williams confirmed that he wants to steer clear of that kind of problem in the future.

'A partner to the MIS manager'

"Corporate executives are making more sophisticated demands on MIS departments, so we've become a partner to the MIS manager, rather than the competitor of the past," Williams said. He noted that GEISCO's new business ventures are not dependent on the cost of hardware or storage.


GEISCO President Williams

W. James McNerney Jr., senior vice-president for marketing and U.S. sales operations, said GEISCO foresees strong growth in intercompany transactions, so it is targeting such applications as medical insurance payments and EDI.

For example, GEISCO recently was selected as the preferred EDI vendor by six trade associations in the paper and publishing industries.

Prodding users to recognize benefits

However, analysts and GEISCO officials agree that the firm is leading the market, often in the position of prodding users into recognizing the benefits of the new intercompany applications.

Mark Winther, an analyst with Link Resources Corp. in New York, said GEISCO is betting the company on markets that have not fully developed. EDI, for example, may not provide significant network traffic and revenue for four or five years, he said, and even then may have slim profit margins.

"Their strategy is to get wired into an industry, via EDI or something similar, and then add additional layers of services on top of that. Their profitability is only going to come when they start building things on top of that asset," Winther said.

GEISCO President Williams put it differently: "We're giving birth to pieces of business that are going to be multimillion-dollar markets." Asked if the parent company will support GEISCO while its new business develops, Williams said GE has given his unit "tremendous corporate support" and considers GEISCO an important part of its high-technology portfolio.

The revamped GEISCO is eschewing generic telecommunications services in favor of sophisticated applications that few MIS departments could handle, Williams said.

Consequently, GEISCO is at least tacitly ceding the market for such generic services as packet switching and basic electronic mail to its competitors, including GTE Telenet Communications Corp. and Tymnet/McDonnell Douglas Network Systems Co.

"GEISCO's strategy is obviously not to be the low-cost communications carrier but to be one of the applied communications vendors," Winther said. "Their strengths are in building intelligent applications, like building a cash management system, an order-entry system or a dealer network," he said.

Sophisticated information exchange

Winther agreed with GEISCO officials that most MIS departments will not find it cost-effective to undertake the kind of sophisticated information exchange applications that GEISCO is developing. "They're betting that these applications are beyond the pain threshold of the MIS department," he said.

GEISCO officials also claim that they are offering customers a highly reliable teleprocessing network with

See **GEISCO** page 114

ADS & CICS

A Winning Combination Since 1974!

Shortly after **CICS** was introduced, **ADS** was developed to identify, diagnose and resolve problems. **ADS** continued to keep pace with the development of **CICS** environments, supporting all DOS, OS, MRO and MVS/XA facilities.

*With **ADS** you will:*

- Move more thoroughly tested applications into production
- Use fewer resources
- Reveal and pinpoint undetectable bugs
- Navigate easily through **CICS**
- Reduce downtime
- Save more than 50% of testing time

ADS

The Advanced Debugging System for **CICS**

Call for details: 201-488-3708
212-475-2400

Interactive Solutions, Inc. 53 West Fort Lee Road, Bogota, NJ 07603

Attend a One-Day Executive Forum on
Practical Relational Implementation
Six Viewpoints
May 22, 1986

The ***Practical Relational Implementation*** Executive Forum offers a unique opportunity to hear these industry experts discuss **what has changed and what needs to change** to implement production systems that use relational philosophy and technology. The Forum will consist of four rounds of panel presentation and interaction.

Value Changes

1. **Dan Appleton, D. Appleton Company** - Management Attitudes
2. **Paul Hessinger, Computer Task Group** - Architecture for Planning and Implementing

Process Changes

3. **Robert Curtice, Arthur D. Little** - Planning and Data Modeling
4. **Robert Brown, DBDG/DACOM** - Physical Design and Data Modeling

Technology Changes

5. **Marilyn Bohl, IBM** - DB2 Technology
6. **David Wood, Cincom** - SUPRA Technology

Date: May 22, 1986
Time: Forum 8:30 a.m. - 4:30 p.m.
Location: Waldorf Astoria Hotel
New York, N.Y. 10022

Fee: $195 per person if paid prior to May 22
$225 per person at door, space permitting
Includes coffee, danish, lunch, wine and cheese.

DACOM
D. Appleton Company, Inc.
1334 Park View Avenue - Suite 220
Manhattan Beach, California 90266
213-546-7575

Register Now!
Enrollment Limited
Call the Executive Forum Information Center at
213-546-7575

Unsure economy stunts progress of software industry

Analyst sees no return to earlier growth rates

By Alan Alper

NEW YORK — Uncertain economic conditions and the inability of many corporations to absorb existing technologies are among the main factors severely stunting growth in the software and services industry, according to the Mountain View, Calif., market research firm Input.

Speaking at a market research panel during ADAPSO's 13th Annual Computer Software and Services Financial Forum recently, Input founder and President Peter Cunningham said the information services industry grew by a paltry 17% last year to $48.5 billion.

Although still growing, that percentage pales considerably in contrast to the industry's historic growth rate of approximately 40% a year.

The prospect for a return to past growth rates this year seems slim, Cunningham said. "I don't see anything in the first quarter that suggests things will improve this year," he noted.

Technology glut

Chief among the reasons for slower industry growth is the continuing technology glut, Cunningham said, which has crimped many end users' abilities to absorb new software products and services.

Much of the new technology already introduced at many corporations has yet to demonstrate to management tangible productivity gains that improve financial results, he added.

Given the slower growth and an economic revival that failed to materialize, Input's Cunningham stated that, despite claims to the contrary, the software and services industry "is affected by the general economy."

In an interview following Cunningham's presentation, Pansophic Systems, Inc. President and Chief Operating Officer William Nelson agreed with the market researcher's analysis.

"The computer industry is a cyclical business," he said. "It's like the auto industry; every time there's a recession, the computer industry will be affected."

Purchase decision procedures stiffer.

One reason for the software and services sector slowdown is that purchase decision procedures at many corporations have become drawn out, Nelson said.

Computer-related expenditures have become a large expense item at most corporations and have therefore come under increased scrutiny by top management, which needs cost-savings justifications before freeing the purse strings.

"Top executives no longer take the computer jock's word that the company needs a new program or system," Nelson said. "If the company has lived without it for the last six to nine months, the executive asks whether the company really needs it at all."

Processing services most affected

Processing services, the largest portion of the information services market, which in past years had grown better than 40% annually, appears to have been most affected by the industry slump. Revenue grew by only 14% to $17.3 billion, Cunningham noted. The professional services market grew only 19% to $7.4 billion last year, he added.

Turnkey software vendors posted collective revenues of $7.4 billion, an increase of only 16%. "These companies suffered the most from efforts by IBM and DEC," which offered competitively priced turnkey engineering systems, Cunningham explained.

While the software products sector grew by 20% in 1985 to $13.3 billion, last year's performance is weak in comparison to the 41% and 30% growth rates registered in 1983 and 1984, respectively.

"What happened here was that those companies which experienced explosive growth in past years ended up overshooting the market last year," Cunningham concluded.

GEISCO angles toward networks

From page 113

global reach. Built-in redundancy and daily contacts with clients help to give the network an availability rating of 99.8%, 24 hours a day, according to Raymond W. Marshall, senior vice-president for technology operations.

However, analyst Winther said that GEISCO's network has lagged behind the other X.25 networks in supporting various conversion capabilities and putting intelligence in the nodes.

"So while it's the largest network in the world, in terms of its value-added features, it's not as wide-ranging as the others," Link Resources' Winther said.

EXECUTIVE REPORTS

Special Editorial Features

Every issue of Computerworld presents either a Product Spotlight or Executive Report. For advertisers it's still not too late to take advantage of one last topic for May!

In-house Publishing (Executive Report, May 26) Focus on the MIS manager's role in corporate electronic publishing. From host-based systems to departmental networks and stand-alone desktop publishing systems. Looks at integration in host-based systems and the role of the IBM PC and Apple Macintosh. Closing date May 9.

And here's what's scheduled for June and July:

ISSUE	TOPIC	CLOSING DATE
June 2	Word Processing Software (Product Spotlight)	May 16
June 16	The BUNCH Companies (Executive Report)	May 30
June 23	Personal Computer Graphics (Product Spotlight)	June 6
June 30	Integrated OA Systems (Executive Report)	June 13
July 7	Data Security (Executive Report)	June 20
July 14	Expert Systems (Product Spotlight)	June 27
July 21	PBX Networks (Executive Report)	July 3
July 28	Management Training for DP Executives (Executive Report)	July 11

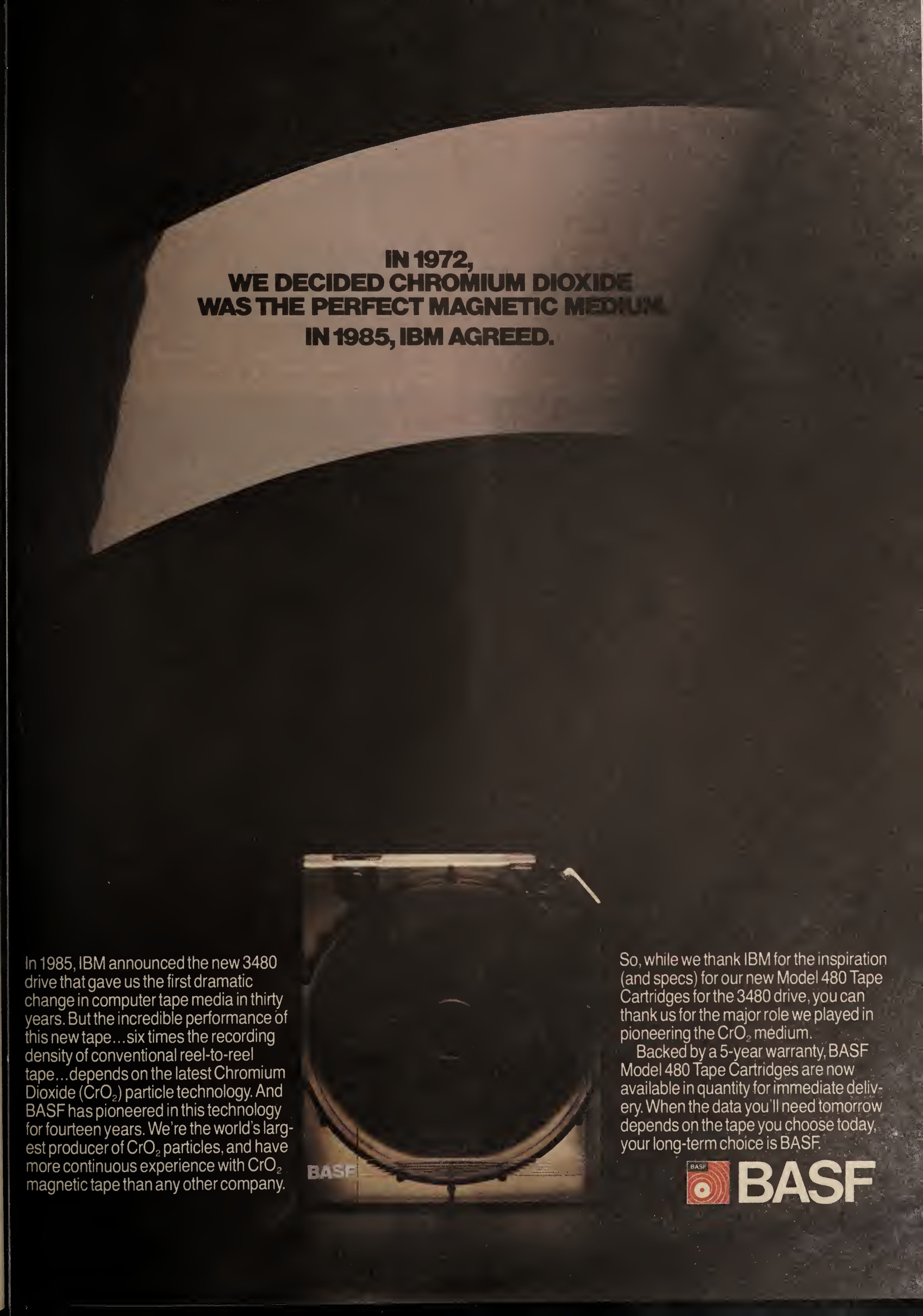
Why not take advantage of these special opportunities to reach your customers? Executive Reports and Product Spotlights focus readers' attention — and that strengthens the power of your ads. Call Ed Marecki, Computerworld's Vice President/Sales at (617) 879-0700 — or call your local Computerworld representative — to reserve space for your ad today.

COMPUTERWORLD

Boston: (617) 879-0700 **New York:** (201) 967-1350
Atlanta: (404) 394-0758 **Chicago:** (312) 827-4433 **Dallas:** (214) 991-8366
San Francisco: (415) 421-7330 **Los Angeles:** (714) 261-1230

A PUBLICATION OF CW COMMUNICATIONS

PRODUCT SPOTLIGHTS



IN 1972, WE DECIDED CHROMIUM DIOXIDE WAS THE PERFECT MAGNETIC MEDIUM. IN 1985, IBM AGREED.

In 1985, IBM announced the new 3480 drive that gave us the first dramatic change in computer tape media in thirty years. But the incredible performance of this new tape...six times the recording density of conventional reel-to-reel tape...depends on the latest Chromium Dioxide (CrO_2) particle technology. And BASF has pioneered in this technology for fourteen years. We're the world's largest producer of CrO_2 particles, and have more continuous experience with CrO_2 magnetic tape than any other company.

So, while we thank IBM for the inspiration (and specs) for our new Model 480 Tape Cartridges for the 3480 drive, you can thank us for the major role we played in pioneering the CrO_2 medium.

Backed by a 5-year warranty, BASF Model 480 Tape Cartridges are now available in quantity for immediate delivery. When the data you'll need tomorrow depends on the tape you choose today, your long-term choice is BASF.

BASF

Tandy, Apple show their age

From page 142

panded sales, but from a decrease in expenses, the result of automation and layoffs.

If sales continue their downward trend at Apple, what are the long-term prospects for a company whose two major microcomputers are not IBM compatible and whose Apple IIe uses an 8-bit technology introduced in 1977?

Without IBM Personal Computer compatibility, the Macintosh cannot win in the corporate marketplace, the only hot market in the industry right now. Apple is talking about linking its machines with other vendors' minicomputers and marketing the Macintosh to large businesses for desktop publishing.

However, most business micros still run in stand-alone mode, and IBM-compatible software is becoming increasingly available for IBM PC desktop publishing.

The Macintosh "simply has not obtained the momentum required to sustain it as a serious alternative to the IBM PC and compatibles in the business market," summarized industry analyst William Zachmann of International Data Corp. in a recent report.

'A tough Christmas for the Apple II'

As prices fall on the IBM PC and the Asian PC clones, both the Macintosh and Apple's cash-cow Apple II, an 8-bit machine that debuted in 1977, are likely to be severely harmed. "I suspect the last quarter of 1986 may make for a tough Christmas for the Apple II," Zachmann observed.

If Apple's long-term profitability seems questionable, the picture is bleaker at Tandy. Like Apple, Tandy cut its teeth in the home market. But Tandy's low-end offerings, such as the Color Computer II, are being blown away in the home market by more sophisticated newcomers such as Commodore Ltd.'s 125.

Worse yet, according to the Paine Webber report, Tandy's gamble for a share of the PC-compatible market — the Model 1000 — is selling almost solely to small business and home users.

Tandy feels retail pinch

Although Tandy never had to fight for retail shelf space, the company is now feeling the pinch of operating some 450 computer retail stores at a time when the retail shakeout is still under way.

To compound Tandy's misery, 1986 will be a year marked by intense PC price cutting. Some analysts estimate an IBM PC will cost about $1,500 by the year's end, and Asian-made PC clones will sell for $800 in December. Indicating that it is already feeling the heat, Tandy recently put its IBM Personal Computer XT work-alike on sale for $1,599.

While it may seem outrageous, the answer to Tandy's need for new proprietary PC technology could be rather simple: Acquire either Commodore or Atari Corp.

Amiga could give Macintosh a run

Commodore, in particular, is saddled with millions in debts and yet has a machine, the Amiga, that could, in the right hands, give the Macintosh a run for its money.

As for Apple, the solution for the short run is to give the Macintosh optional IBM compatibility and, in the long run, to replace the IIe with a Macintosh-like PC selling at about the same $1,000 price.

Apple, in fact, is expanding its offshore manufacturing capacity and may have just such a move in mind.

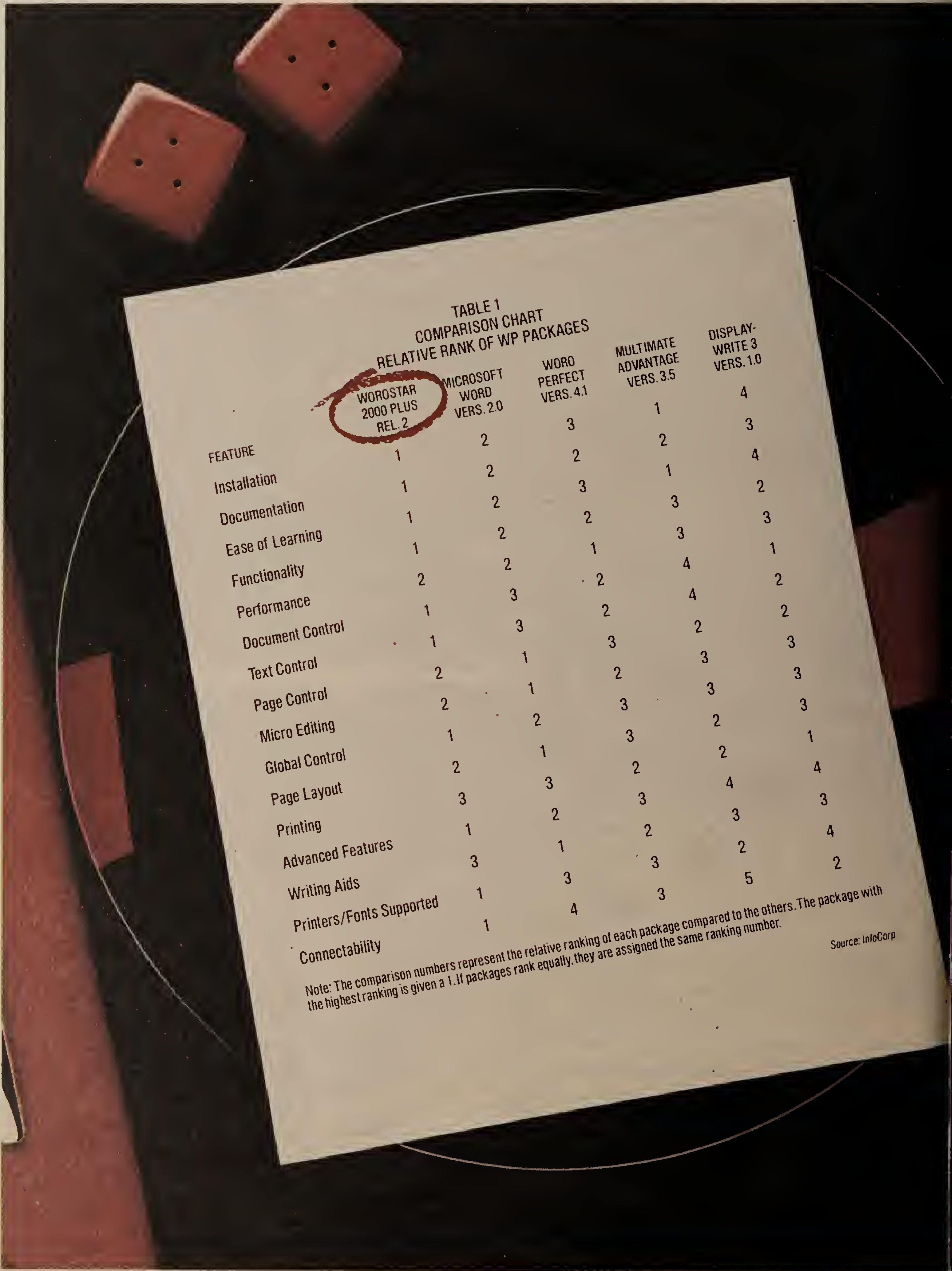


TABLE 1
COMPARISON CHART
RELATIVE RANK OF WP PACKAGES

FEATURE	WOROSTAR 2000 PLUS REL. 2	MICROSOFT WORD VERS. 2.0	WORO PERFECT VERS. 4.1	MULTIMATE ADVANTAGE VERS. 3.5	DISPLAY-WRITE 3 VERS. 1.0
Installation	1	2	3	1	4
Documentation	1	2	2	2	3
Ease of Learning	1	2	3	1	4
Functionality	1	2	2	3	2
Performance	2	2	1	3	3
Document Control	1	3	2	4	1
Text Control	1	3	2	4	2
Page Control	2	1	3	2	2
Micro Editing	2	1	2	3	3
Global Control	1	2	3	3	3
Page Layout	2	1	3	2	3
Printing	3	3	2	2	1
Advanced Features	1	2	3	4	4
Writing Aids	3	1	2	3	3
Printers/Fonts Supported	1	3	3	2	4
Connectability	1	4	3	5	2

Note: The comparison numbers represent the relative ranking of each package compared to the others. The package with the highest ranking is given a 1. If packages rank equally, they are assigned the same ranking number.

Source: InfoCorp

ITC throws hat into commercial marketplace ring

By Mitch Betts

McLEAN, Va. — Iverson Technology Corp. (ITC), a systems integrator best known for landing government contracts at military and intelligence agencies, has announced an expansion of its marketing team in order to enter the commercial marketplace.

"Our decision to expand into the commercial integration field will carry us into the Fortune 1,000 companies, as well as the total government market," said Donald D. Iverson, chairman and chief executive officer.

The systems integration firm has enjoyed rapid growth fueled by government contracts, primarily for systems that meet the Tempest security standard issued by the U.S. Department of Defense. Tempest equipment is shielded to prevent emissions of electromagnetic radiation that would disclose sensitive information.

The firm, founded by Iverson in 1978, went public in July 1985.

ITC stocked its marketing division with several former IBM salesmen. Kenneth E. Wylie, a former IBM and Masstor Systems Corp. marketing official, will head the division as senior vice-president of marketing.

Reporting to Wylie will be Barry S. Josephson, vice-president for federal marketing, and R. Joseph Market, vice-president for commercial marketing. Both men had extensive experience at IBM, ITC reported.

In addition, Edward K. Wachter joined ITC as vice-president of programs to manage a bid-and-proposal team and to establish the firm as an OEM of printers, plotters and optical character readers, ITC announced. Wachter came from Lockheed Electronic Co.'s Washington, D.C., office.

5¢ 10¢ NICKELS AND DIMES

Masstor Systems Corp. reported a net loss of $9.8 million, or 61 cents per share, on revenue of $2.4 million for the year ended Dec. 31, 1985. This figure compares with a net loss of $17.4 million, or $1.11 per share, on revenue of $26.3 million in the previous year.

■

Icot Corp. announced revenue for the fourth quarter ended Feb. 1 of $12.4 million, compared with $6.2 million in the corresponding period a year earlier. Profits for the quarter were $1.7 million, or 18 cents per share, compared with $188,000, or 2 cents per share in the previous year.

■

Softech, Inc. reported revenue of $11.3 million for the third quarter of fiscal year 1986, a 26% increase over the same period a year earlier. Net income for the third quarter ended Feb. 28 was $578,717, or 16 cents per share, compared with 6 cents per share in the third quarter of the previous year.

■

L. M. Ericsson reported revenue for the year of $4.2 billion, up 11% over 1984. Income per share, after taxes paid and after estimated deferred taxes on appropriations, was $1.99, compared with $2.62 in the previous year.

Income before appropriations and taxes during 1985 amounted to $115 million, down from $206 million in 1984. Capital gains on sales of shares and property account for $43.7 million of this income.

■

Avant-Garde Computing, Inc. reported for the third quarter ended Jan. 31 a net loss of $1.3 million, or 35 cents per share, compared with earnings of $245,000, or 7 cents per share, for the third quarter of the previous fiscal year. Net revenue was $3.6 million for the quarter, compared with $5.3 million for the comparable period the year before.

■

Fortune Systems Corp. reported revenue for the first quarter ended March 31 of $10.7 million, compared with $9.8 million in the previous year. Profits were $345,000, or 2 cents per share, compared with a net loss of $3.8 million, or 18 cents per share, reported in the like quarter a year ago.

Olsen chides management

From page 142

'You've tolerated this all along and haven't done anything about it.' "

Olsen said DEC's ability to provide a family of compatible systems, all running the same software, was an important ingredient in the firm's stellar performance over the last nine months in the face of weak market conditions.

For the nine months ended March 29, DEC reported revenue of $5.4 billion, up 12% from the year-earlier period. Net income for the period increased 9.4% to $346.2 million.

Single-bus architecture

During Olsen's upbeat presentation, he extolled the virtues of DEC's use of a single-bus architecture, spanning the entire VAX line from the Microvax workstation to the firm's new high-end VAX 8000 series.

There is more software written to operate in VAX environments than for any other system's architecture, Olsen claimed.

"When the Russians want to steal a computer they steal one with the most software. That's why we get in trouble," Olsen joked.

'Dull organization'

The No. 2 computer maker, currently in favor on Wall Street, is essentially the same company that analysts excoriated just a couple of years ago for being complacent and obsolete, according to Olsen. "Two and three years ago they said we were a dull organization with a disciplined approach to computing. The PC was only a small part of what we do, and with that I was called too old," Olsen recalled. "Today, we have the same message. We may be dull, but today it pays off."

Olsen said DEC's disciplined approach to the design and manufacture of its new systems has paid dividends in the firm's ability to increase its operating margins from the 6%-to-8% range of a couple of years ago to 11% today.

"Of course, we don't discount like everyone else," Olsen said. "That is the most important part of margins, above anything else."

Operating margin low

DEC's operating margin, though trending upward, is still well below the firm's pre-1983 levels of 16% to 18%, noted Vice-President and Chief Operating Officer James Osterhoff.

With three new VAX systems — the 8800, 8300 and 8200 — at the beginning of their product life cycles, Olsen was optimistic regarding DEC's ability to continue the upward revenue and profit trends for the remainder of the year. He stopped short of offering any prognosis beyond saying, "There's no reason to think our profits will go down."

In anticipation of increased sales, Olsen said the firm would add personnel to its sales and support staffs. He declined to quantify the increased staffing levels, noting the hiring of additional sales representatives would depend on increased sales. A DEC spokesman said the firm has 6,000 sales representatives worldwide and a sales support team of 6,000.

SINK YOUR TEETH INTO THIS.

Introducing WordStar® 2000 Plus Release 2, the new and improved software that topped InfoCorp's chart of word processing packages.

We could make all kinds of claims about our new WordStar 2000 Plus Release 2.

About its commonsense commands. Tutorials for easy training. Direct Lotus® file input Extensive printer support. DCA connectivity. LANs and site licensing options.

That would be easy to do.

But we decided to let the experts do the talking.

In a comparative report—the report containing the chart to the left—Robert Lefkowits of InfoCorp said:

"WS 2000+ emerges as a clear winner in overall applicability. InfoCorp believes WS 2000+ would appeal to the largest number and widest variety of users. Its layered functionality, ease of learning, and excellent communications features make it ideal for corporate users, ranging from secretaries to clerks to managers to executives."

And, after reviewing WordStar 2000 Plus Release 2 alongside MultiMate™ Advantage™ and IBM®'s DisplayWrite® 3, International Data Corporation's Jim Chapman concluded:

"WordStar 2000 is our favorite—for ease of learning, ease of use... and for well-conceived and helpful documentation."

Now we don't expect you to take these opinions as gospel.

Because when it comes to knowing your company's word processing needs, you're the expert who really matters.

So evaluate our product yourself.

See your local MicroPro dealer today. Or call 800-227-6703 (800-632-7979 in California) for the dealer nearest you. Put WordStar 2000 Plus Release 2 to the test and see how it measures up to the advance reviews.

We believe it'll be time well spent. For you and your company.

If you'd like the complete InfoCorp and IDC reports, we'll be happy to send them to you. Just fill out the coupon below and mail it to us, or call 800-443-0100 x. 547.

MicroPro®

Powerful word processing has never been easier.™

MicroPro International, Industry Analyst Reports
P.O. Box 57135, Hayward, CA 94545
Yes, I'd like copies of the InfoCorp and IDC Reports on WordStar 2000 Plus Release 2. Please send them to me right away.

Name__________
Title__________
Company__________
Address__________
State__________ Zip__________
Phone (______)__________

Lotus and IBM DisplayWrite 3 are registered trademarks of Lotus Development Corporation and IBM Corporation, respectively. MultiMate and Advantage are trademarks of MultiMate Corporation Current WordStar 2000 owners can update to WordStar 2000 Release 2 by calling MicroPro Customer Update: 800-433-0100 x 265. BB05M 2/86

Talk
is Cheap.

It's
Performance
That
Counts.

Today's system software buying decisions will affect your company for years to come.

Before you select a vendor, talk to people you can trust.

If you're about to invest in system software for your mainframe, here's some free advice that may surprise you:

Go slowly.

The decision you're making will be felt for years to come throughout your entire organization. So don't try to shortcut the selection process.

And in particular, don't make a decision without talking to people with first-hand experience—the users of the products in question.

Naturally, we believe that Software AG products offer the best solutions available to the problems you face. And we'd like to have an opportunity to convince you—not by competitive claims and counterclaims, but by demonstrated performance in real-world customer sites.

In the meantime, we'd like to offer a few thoughts on some factors that contribute to performance.

Needed: integrated, long-term, worldwide solutions.

If you've been involved in data processing for any length of time, you already know more than enough about the dangers of piecemeal "quick fixes". You don't have to be sold on the value of integrated tools that meet a full range of organizational needs through a common syntax and shared procedures.

But while many vendors preach integration, few practice it on the scale of Software AG. From our core products, ADABAS and NATURAL, we have created an entire universe of software products that simultaneously meet the needs of everyone from MIS professionals to end users with no programming experience.

We're also integrated in another way—geographically. As more and more organizations seek to coordinate resources and data on a worldwide basis, they need a caliber of support that is consistent worldwide. Software AG's reach is unique among independent software vendors—with products installed in 52 countries.

Fourth-generation technology: Who needs it? Who's got it?

A lot of vendors have expended a lot of hot air on the subject of fourth-generation languages. And we'd be the last to deny that a well-designed 4GL like NATURAL can be a phenomenal productivity tool—as much as 10 to 20 times more productive than COBOL, for instance.

But the language itself is only part of the story. Because in committing to a fourth generation system, you're really committing to an entire technology for meeting your organization's needs. You'd better be sure that technology includes everything you need—from DBMS, 4GL, and data dictionary to end-user computing tools, office systems, micro/mainframe links, and intersystem communication facilities. If it doesn't, you may be looking at only a partial solution.

In any case, don't evaluate a 4GL by itself. Evaluate it in relation to the other products that are required to satisfy your total information needs. Do they share a common architecture or syntax? Were they designed together, or are they simply marketed together? And most important of all, how do people like working with them?

We *know* how people like working with NATURAL. After all, it's the world's most widely installed, widely experienced fourth-generation language—used by over 75,000 programmers. If you're looking for insights into 4GL technology, you might start by talking with one of them.

Industry surveys repeatedly rate Software AG #1.

It's one thing for a vendor to be proud of its products. It's another for an entire industry to share in that high regard.

Yet that's just what's been happening with Software AG products. For several years, *Datapro* and *Datamation* have both published annual surveys of system software users. And Software AG has repeatedly come out on top by a variety of yardsicks. That's not rhetoric—that's performance.

Software AG: high-performance vendor to over 2000 customers.

Because system software is a long-term investment for most organizations, it inevitably carries with it a long-term relationship with the software vendor.

And for many years, we and our users have recognized the importance of that relationship. In fact, we have worked together to shape it in the interests of delivering the best possible product performance.

But while we're glad our users take the trouble to respond to surveys, we have no control over their comments.

Which makes it all the more gratifying to see the survey results. And all the more imperative that you hear what users have to say—before you buy.

Just give us a call today. Or send in the coupon. We'll be glad to put you in touch with Software AG users in situations comparable to yours, so you can find out for yourself what industry insiders have known all along:

Anyone can talk. But when it comes to performance, Software AG stands alone.

Call us at 1-800-336-3761.
(In Virginia and Canada, call 1-703-860-5050.)

I'm tired of talk. Let me see some performance.

Name____________________

Title____________________

Company____________________

Address____________________

City____________ State______

Zip______ Phone____________

Current DP Environment____________

Software AG
11800 Sunrise Valley Drive, Reston, VA 22091 CW0505

SOFTWARE AG
11800 Sunrise Valley Drive, Reston, VA 22091

Sperry reports profit decrease, revenue increase of 15.5%

Blames slump, defense, aerospace operations

By Alan Alper

NEW YORK — Sperry Corp., citing the general slowdown in the computer industry and problems in its defense and aerospace businesses, last week reported that profits from continuing operations for fiscal year 1986 declined 3% to $280 million, or $4.92 a share. Revenue for the year ended March 31 increased by 15.5% to $5.7 billion.

For fiscal year 1986, net income was $46.8 million, or 82 cents per share, down 84% from last year's $286.7 million, or $5.15 per share. Sperry attributed its decline to a previously reported after-tax loss of $233.2 million, or $4.10 per share, resulting from the divestiture of its Sperry New Holland Division farm equipment business. For the fourth quarter, profits from continuing operations increased by 7.4% to $115.3 million, or $2.02 a share, while revenue jumped 13.5% to $1.8 billion.

In a prepared statement, Sperry Chairman and Chief Executive Gerald Probst said that in light of the computer industry slump and of internal problems in the firm's defense and aerospace operations, the firm's results were "satisfactory."

"Revenue and operating profit gains of more than 20% in our commercial computer operations were offset in part by lower profits of our defense and aerospace operations, which have experienced a strike and production problems that have largely been overcome," Probst said.

The Sperry chief executive said the firm was particularly pleased with growth in its micro products line and increasing evidence that its Unix effort is gaining momentum. The firm projected that orders and shipments of its top-of-the-line 1100/90 would continue at last year's levels while low-end microproducts would increase significantly. The company declined to provide specific figures.

Probst warned that first-quarter fiscal year 1987 results would be below year-earlier levels because of a relatively strong performance in the comparable period and heavy order activity in the fourth quarter.

The company declined to project first-quarter results. In the first fiscal quarter of 1986, Sperry earned $51.5 million on restated revenue of $1.2 billion, according to a company spokesman.

Despite the continuing computer industry slump and uncertainties over the impact of proposed federal budgetary changes, Probst said the firm expected to achieve revenue and operating profit growth in fiscal year 1987.

Compaq sales increase by 48%, income up 80%

By Eric Bender

ATLANTA — Compaq Computer Corp. continues to show steady financial growth, achieving sales of $144 million and a net profit of $8.3 million during the quarter ended March 31. The figures represent a 48% sales increase and 80% income boost over the Houston-based personal computer supplier's corresponding figures for first-quarter 1985.

Discussing the results at Comdex/Spring last week, President Rod Canion said Compaq's gross margins had climbed to 39% in the latest quarter, up from 32% the year before, although the company had nearly doubled spending on sales and marketing, from $11.0 to $21.3 million.

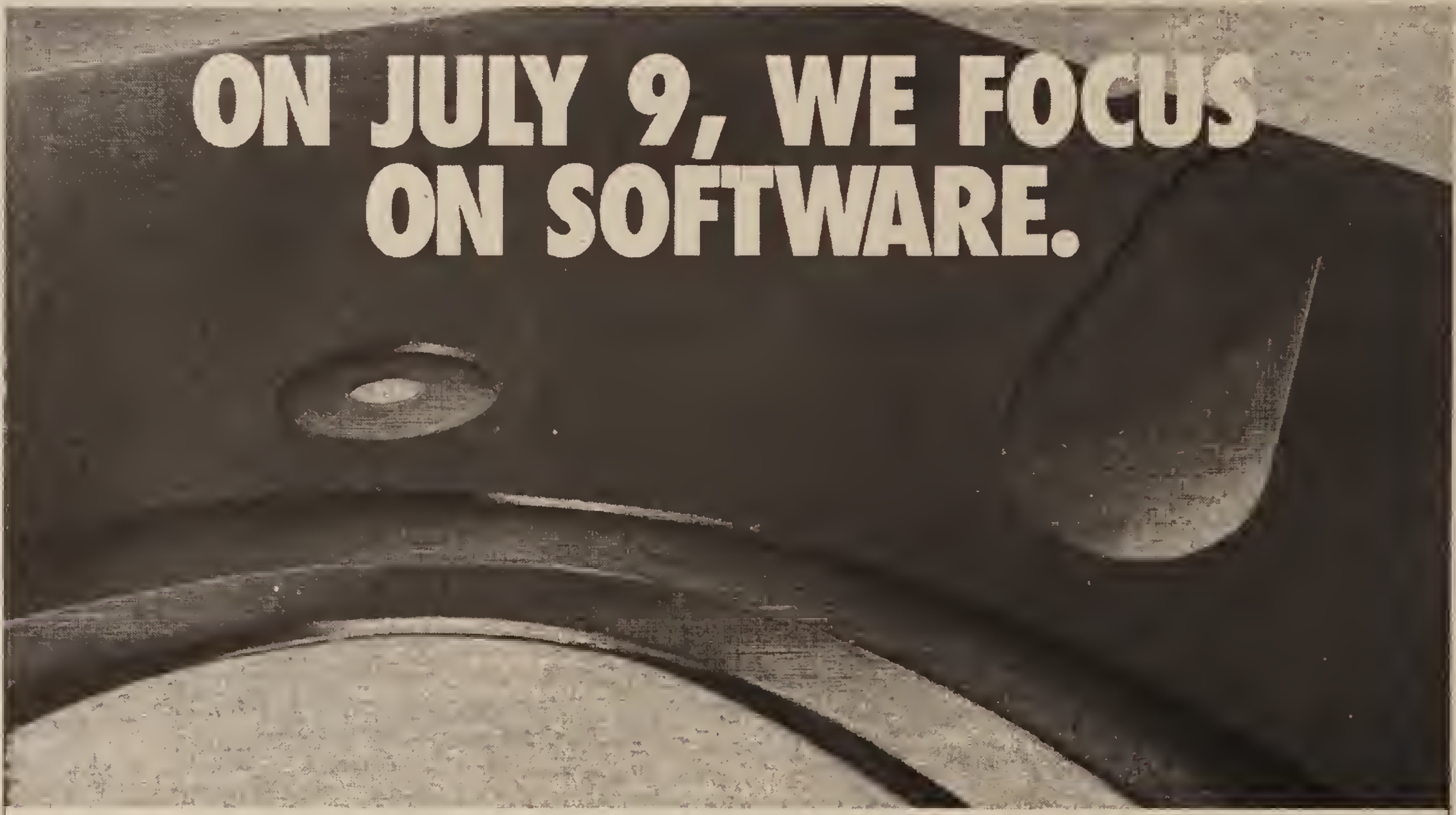
Compaq cut pricing on its original Intel Corp. 8088-based lines in February and on most of its other models last month, but Canion said the price reductions had been planned considerably in advance and were part of normal industry cost trends.

Overall, the company's unit sales are growing slower than revenue because of the transition to the higher priced IBM Personal Computer AT-compatible systems, Canion said. He estimated that in overall industry sales of ATs and AT-compatibles during the first quarter of 1986, IBM took 70%, Compaq accounted for 26% and other vendors sold 4%.

"Last year there seemed to be a belief that it was a wide-open race," he commented. But aside from IBM, "We're the only company to take a significant share," he claimed.

Canion described the turmoil in the microcomputer distribution channel as a consolidation rather than a shakeout. "The dealer network will continue to get stronger" as additional capitalization becomes available, he predicted.

Although many see Compaq and other IBM-compatible suppliers at risk as IBM accelerates development cycles, Canion downplayed the threat. "We can go from the beginning of design to having a product in volume production in as little as six months and more reasonably nine months. Anything new is not going to impact the market in that time."



The market for software is simply going wild. With new applications. New technologies. New ideas. And MIS/DP professionals are the ones who have to deal with it all.

The key is making different software work together. Not just applications software, but operating software, too.

Our July 9 issue will address the latest in software from DBMS to decision support systems to fourth generation languages and the role each plays in integrated systems.

Then we'll zero in on productivity.

Our July special section also tackles one of the biggest software issues. Productivity.

We'll start with a look at the popular and innovative products that are the driving force behind most hardware today. We'll update readers on the continuing evolution of 4GLs, DBMS systems and more. We'll check out new and developing tools for system productivity. And, finally, we'll ask MIS professionals how they're planning to implement all these new products and technologies.

Reach the people you really want.

We'll be reaching precisely the people you want to reach. 129,000 paid Computerworld subscribers. Plus thousands of pass-along readers. Plus attendees at PC Expo and Software Expo. If you're involved in software marketing, you couldn't ask for a more qualified audience of decision makers.

We'll even be providing you with a free Starch study for qualifying advertisements. Which can help you determine if your advertising is as effective as your media buy.

Reach your audience effectively — and efficiently — in July's Software Focus.

But hurry, closing is May 30. For more information, contact Ed Marecki, Vice/President Sales, Computerworld Focus, 375 Cochituate Rd., Framingham, MA 01701-9172, (617) 879-0700. Or call your local Computerworld sales representative.

Issue: July 9 - Closing: May 30

COMPUTERWORLD FOCUS

We put the hottest issues of the day in focus.

A PUBLICATION OF CW COMMUNICATIONS

SALES OFFICES **Boston:** (617) 879-0700/**New York:** (201) 967-1350/**Atlanta:** (404) 394-0758 **Chicago:** (312) 827-4433 **Dallas:** (214) 991-8366 **San Francisco:** (415) 421-7330/**Los Angeles:** (714) 261-1230

GO FOR IT

The Supermini Real-Time Benchmark Challenge

Take your best shot

We're throwing down the gauntlet and challenging you to challenge the best. If you're evaluating high performance supermini systems, **demand a benchmark**. Try the parallel processing power and awesome real-time efficiency of our 3280 MPS against the other guys. Read on and we'll tell you how to set it up today. But first, take a look at what they'll be up against.

The 3280 has:

- As low as $26K per MIP
- Easy expansion
- Up to 33 MIPS
- Growth without replacement
- High availability
- Low life-cycle cost
- 64 MB/sec. bandwidth

And if that doesn't impress you, check out these High-End Supermini price performance numbers:

	Concurrent Computer Corporation 3280MPS	DEC 8600	DEC 8650	DEC 8800
Entry-Level System Price	$250,000 to $860,000	$350,000	$475,000	$650,000
Performance in MIPS *	6 to 33.8	4.7	6.9	11.3
$K/MIP	$40.7K to $25.5K	$74K	$68.8K	$57.5K

List prices are for processor only or entry-level configurations.
* Single precision whetstones.

The truth is the proof

We're putting the test of real-time on the line.

All you have to do is fill out the coupon or call. We'll put you in touch with one of our worldwide benchmark centers. They'll show you how the 3280 MPS is making real-time performance history by meeting the toughest real world challenges.

We're ready for your challenge of the 3280 MPS. When we win . . . you win!

The 3280 MPS from Concurrent Computer Corporation. To take the 3280 MPS challenge, or receive more information, mail the coupon. Or call toll-free: **1-800-631-2154**.

Concurrent Computer Corporation

I'll go for it.

Name____________________________

Title_____________________________

Company________________________

Address_________________________

City____________State____Zip____

Phone (   )_____________________

Application______________________

Mail to: Concurrent Computer Corporation,
Two Crescent Place, Oceanport, N.J. 07757.

CW050586

BUSINESS NOTES

Intel vs. NEC copyright trial delayed a week

The copyright infringement trial between **Intel Corp.** and **NEC Electronics, Inc.** was postponed a week because of a scheduling conflict in U.S. District Court in San Jose, Calif. Jury selection is expected to begin by midweek.

■

The **U.S. Department of Commerce** last week issued a final ruling that Japanese producers indeed are dumping 64K-byte dynamic random-access memory (RAM) chips in the U.S. The action confirmed a preliminary ruling in December that Japanese firms were selling dynamic RAM chips at below-market value.

If the U.S. International Trade Commission confirms within 45 days that the alleged dumping has hurt the U.S. industry, the government will impose penalty duties ranging from 12% to 35% to offset the Japanese price advantage.

■

South Korean manufacturing conglomerate **Daewoo Corp.** has acquired a controlling interest in **Zymos Corp.**, a U.S. semiconductor vendor hit hard by the industry recession. The move will give Daewoo four of the seven seats on the Zymos board of directors.

The buy-in was made via the purchase of a block of 6.3 million shares of Zymos stock at an unspecified, but below-market price, Zymos said. That block of stock had been held by Intermedics, Inc., which gave up the stock in exchange for being relieved of lease obligations and a commitment to advance funds to Zymos.

■

Software Publishing Corp. said it will join the ranks of microcomputer software vendors dropping copy protection in response to corporate customer requests.

The Mountain View, Calif., firm will issue new, unprotected versions of its two Harvard product line programs, Harvard Total Product Manager and Harvard Presentation Graphics, in mid-May, a company spokeswoman said. Copy protection also will be dropped for Software Publishing's best-selling lower end PFS line of products in their next upgrades.

■

Isuzu Motors Ltd. announced recently an agreement with Dallas-based Electronic Data Systems Corp. under which Electronic Data Systems will process research and development information and handle all international data transmission for Isuzu. According to Isuzu, the deal arose after Electronic Data Systems was purchased by General Motors Corp., which owns 38.6% of Isuzu.

The agreement will take effect this month and was signed by Isuzu and Electronic Data System' Japanese subsidiary, EDS Japan, in April.

Microcomputer Memories goes bankrupt

Crowded market takes toll on disk drive maker

CHATSWORTH, Calif. — Caught in a market with too many competitors, 3½-in. disk drive manufacturer Microcomputer Memories, Inc. filed for protection under Chapter 11 of the Federal Bankruptcy Code late last month.

An early entrant in the market for 3½-in. disk drives, Microcomputer Memories was founded in 1982. Two years later the company went public just as the window for high-tech companies was beginning to close.

"It may not have been that they did anything wrong. It just sounds to me like a company that was caught in a market with too many competitors," said consultant Ray Freeman, of Freeman Associates, Inc. in Santa Barbara, Calif.

Microcomputer Memories shipped its first 10M-byte disk drives in May 1984. Design changes delayed the introduction of its 20M-byte disk drive in January 1985, and by then, the market had already taken its toll. "Two design changes were probably too big a capital hit for Microcomputer Memories at a time when capital resources were getting conservative," noted Dataquest, Inc. analyst Jim Moore.

One month after the 20M-byte disk drive introduction, the company laid off 28% of its work force. This February, 26 more employees were laid off.

For the fourth quarter ended March 31, Microcomputer Memories lost $2 million on sales of $2.4 million.

The failure of the disk drive manufacturer comes just as the market for 3½-in. disk drives appears to be ripening, analysts say. Recently, IBM announced it would support a 3½-in. floppy disk drive in its newly released laptop computer.

"The length of time that it took for IBM to endorse the 3½-in. product certainly slowed down the market growth in that area," Freeman said.

— **Maura McEnaney**

Learn to Build and

Attend the Network Management/Technical

June 9-12, 1986

World Trade Center, Boston

NM/TC is a highly focused, technical conference.
It is designed to brief network managers and technical control personnel on the latcst products, services, concepts and software available to solve the problems of complex networks in today's rapidly changing telecommunications environment.

NM/TC is a must for network managers.
The conference offers useful and to-the-point help in coping with a variety of management and technical issues from planning to SNA networks.

Conference Program — June 11th and 12th
The NM/TC conference offers a special opportunity for network managers, with hard-hitting and professional presentations. NM/TC is specifically designed for those managers who must operate at two levels - both managerial and technical. Forty sessions are offered.

Exposition — June 11th and 12th
The exhibits will display state-of-the-art equipment from the leading vendors in the industry where you can personally examine the next generation of network control centers, management systems, modems, multiplexers, diagnostic and test systems, and more.

NM/TC sponsoring exhibitors play a prominent role in the show — Avant-Garde Computing, Datacomm Management Sciences, and Racal-Milgo.

NETWORK MANAGEMENT TECHNICAL CONTROL

Exhibitors —
Atlantic Research, Connections Telecommunications, Digilog, Digital Communications, Digitech Industries, INFINET, Infotron Systems, NCR Comten, *Network World*, Northern Telecom/Spectron, *TP+P*, Telenex, Telephony, Venator Systems, Versa-Lite Systems, Wandel & Goltermann.

Keynote Speaker:
Richard J. Holleman
Director of Standards Practices, IBM Corp.

Featured Session:
Top Vendors of 1990
Will Zachmann
Chairman
VP/Research, IDC

In-Depth Tutorials — June 9th and 10th
Industry experts will instruct full-day courses on network control, IBM/SNA network management systems, strategic planning and network diagnostics.

Monday, June 9, 1986

9:00 am - 5:00 pm
Select One

T-1 Fundamentals of Network Control
Gabriel Kasperek, President, Kazcom, Inc.
The basics of network control, including problem diagnosis and repair, maintenance and operational issues.

T-2 Integrated Voice/Data Corporate Networks
Roshan Lal Sharma, Sr. Scientist/Consultant, Telecommunications Network Science.
Network topologies and their synthesis, cost-effective network planning, future trends in intelligent networks and their impact on network management and control.

T-3 Cost Efficient Methods for Implementing New Tariffs
Cheryl A. Cushing, Manager, Reference Services, Connections Telecommunications, Inc.
Post-divestiture tariff rules, including LATAs and POPs with a comparison of major common-carrier tariffs, and evaluation of intra-LATA access alternatives and a review of new regulatory alternatives to traditional network costs.

T-4 ISDN I
Samuel Lynch, Senior Consultant, Zatyko Associates.
Definition and concepts, application standards and world-wide status, plus comparison of ISDN against OSI Reference Model as standard.

T-5 System Network Architecture I
Thomas Routt, Senior Consultant, Zatyko Associates.
Current status of IBM's communication architecture, new extensions such as LU 6.2/APPC and NETBIOS and IBM LANs as "defacto" standards.

U.S. attempts to take wind from Asian software pirates' sails

Battle moving from the legislative arena to the police station

By Edward Warner
Computerworld News Service

WASHINGTON, D.C. — When approximately 70 police officers swooped down on a flashy Hong Kong shopping arcade last month, they were looking for software pirates and — thanks to the help of a U.S. software firm — they knew where to find them.

In all, 17 people were arrested, and $130,000 worth of illegally copied software was confiscated in the raid, which resulted from a tip by Cambridge, Mass.-based Lotus Development Corp.

According to Lotus spokesman Michael Blaber, Lotus laid the groundwork for the raid by conducting its own investigation of the shopping arcade, proving to the Hong Kong police that roughly 40 stores were selling pirated Lotus software — some for as little as $20 per package.

Lotus' action, reportedly a first for a U.S. software vendor, indicates the increasing involvement of U.S. software vendors in the battle against software piracy and how that battle is moving in some nations from the legislative arena to the police station.

At the request of the U.S. Department of Commerce, many nations, including Taiwan and Hong Kong, have granted copyright protection to U.S. products. Now, both the U.S. government and U.S. software vendors are pushing to have those laws enforced.

The Commerce Department's approach has traditionally been to educate nations that tolerate rampant piracy on the need for copyright laws and copyright enforcement. Taiwanese officials, for instance, will soon receive a series of Commerce Department seminars on enforcing their revised copyright law, according to Commerce Department international economist Eileen Hill.

The Commerce Department, however, is also becoming increasingly willing to flex its muscle against those who steal U.S. intellectual property, including recordings, videotapes and computer software.

Last week, the agency launched a new offensive against nations where piracy is widespread, threatening those nations with possible U.S. trade sanctions, including denial of the preferential treatment provided under the Generalized System of Preferences (GSP). The GSP gives developing nations a discount on the tariff they pay to bring goods into the U.S. and is particularly important to such trade-dependent nations as South Korea and Taiwan.

In a further show of U.S. strength, South Korea is now under investigation by the Commerce Department for allegedly violating U.S. product copyrights, which South Korean law does not recognize.

When it comes to software piracy, most experts agree that Asian nations lead the pack. In China, which has no copyright laws at all, an estimated 10,000 pirated copies of Ashton-Tate's Dbase software were sold last year, according to the company's executive vice-president for international and domestic sales, Ron Posner.

> ”
>
> *The Commerce Department is becoming increasingly willing to flex its muscle against those who steal U.S. intellectual property.*

Lotus estimates losses at $100,000 a month to Asian pirates.

To combat Asian software piracy, Ashton-Tate, Lotus and Micropro International Corp. last year formed a Hong Kong-based group called the Anti-Piracy Association.

The association, which also includes an Australian software distributor, is conducting a public relations war on Hong Kong-based piracy and is advising software publishers on how to get Hong Kong's copyright laws enforced, Posner said. Member vendors have also written to the world headquarters of their multinational corporate users urging them to warn their foreign affiliates against using pirated programs.

Posner, the chairman of an ADAPSO committee on international business practices, said he expects his committee, and ADAPSO itself, to become more involved in antipiracy efforts.

On the whole, however, the software vendors are battling international piracy behind the scenes, and only Lotus has successfully instigated a police raid. While Lotus sued U.S. users over what it claimed were pirated programs, overseas it has been more circumspect.

"It's easier to prove that a dealer knew he was violating the law," than to prove a user knew the software was pirated, Lotus spokesman Blaber concluded.

Control Your Network

Control Conference and Exposition

Kasperek

Lal Sharma

Cushing

Lynch

Routt

Zatyko

Rhue

T-6 Public/Private Data Network I
Daniel Zatyko, President, Zatyko Associates.
Current status of IBM's communication architecture, including applications and standards, and development of X.25 up to 1988 CCITT adoption.

T-7 MAP/TOP Systems Interconnection I
Donald Harring, Vice President, Zatyko Associates.
Status of seven layer OSI Reference Model as framework for future network compatibility, review of major vendor architecture - IBM, DEC, etc; migration to manufacturing automation and office communication protocols.

Tuesday, June 10, 1986

9:00 am - 5:00 pm
Select One

T-8 Planning the Network Control Center
Gabriel Kasperek, President, Kazcom, Inc.
User considerations in the design, equipment selection, software, and instrumentation of a network control center and related vendor issues.

T-9 Problem Resolution and Network Management in SNA Networks
Fred Cook, Senior Consultant Kaptronix.
Techniques useful in analyzing problems in SNA networks. Topics include detailed SNA sequences, VTAM trace, NCCF, NPDA, NLDM and a review of critical parameters in NCP System Generation.

T-10 Network Modeling/ Design Workshop
Larry Rhue, Vice President, Connections Telecommunications Inc.
Network design calculations using MNDS PC-based design software and the complimentary Borland SIDEKICK package. Also included, queuing calculations in simple and complex .network models, reflecting SDLC, BSC and X.25 protocols, statistical multiplexers and distributed concentrator networks.

T-11 ISDN II
Samuel Lynch, Senior Consultant, Zatyko Associates.
Technology and system/network/switching of ISDN, and certification and network testing, including 1986/87 field trials/user implementation.

T-12 System Network Architecture II
Thomas Routt, Senior Consultant, Zatyko Associates.
Technology and systems impact of SNA and relation to open architectures and protocols on networks from DEC and other vendors, and higher layer SNA services - DIA/DCA, PU 2.1, etc.

T-13 Public/Private Data Network II
Daniel Zatyko, President, Zatyko Associates.
Technology and systems impact of long distance, regional and in-house data networks, including message handling systems and office document interchange formats under different operating systems.

T-14 MAP/TOP Systems Interconnection II
Donald Harring, Vice President, Zatyko Associates.
Session will cover MAP/TOP common protocol connectivity, GM and Boeing programs, other vendor demos, user experiences and the implications of Corporation for Open Systems on MAP/TOP, vendor standards and products.

You can't afford to miss NM/TC, the most comprehensive technical show of its kind held at the World Trade Center, Boston's high tech showplace.

To register, please fill out the coupon below and send it to NM/TC, Box 9171, Framingham, MA 01701-9171 or call us at (800) 225-4698 or (617) 879-0700.

Network Management/Technical Control Conference & Exposition
Box 9171, Framingham, MA 01701-9171

☐ **YES,** please register me for NM/TC at the World Trade Center, Commonwealth Pier, Boston.

Conference Fees
☐ One-day Conference & Expo (includes lunch) $100.00
Check one: ☐ Wednesday, June 11 ☐ Thursday, June 12
☐ Two-day Conference & Expo (includes lunch) $195.00
June 11-12
☐ "In-Depth" All-Day Tutorials. Advanced registration required.
  ☐ Monday, June 9 (includes lunch) $295.00
  Session # ____________
  ☐ Tuesday, June 10 (includes lunch) $295.00
  Session # ____________
  ☐ Full Four-Day Conference (includes lunch) $690.00
  Session # ____________ # ____________
All registrations include FREE admission to the Exposition

Please type or print:
Name ____________
Title ____________
Company ____________
Street, P.O. Box ____________
City, State, Zip ____________
Telephone ____________

Credit card billing is available. Call (800) 225-4698 or (617) 879-0700.
Registrations canceled later than May 30th are subject to a $50.00 service charge. Registrations may be transferred at no charge.

NM/TC is brought to you by the Communication Networks show team and is managed by CW/Conference Management Group, a division of CW Communications/Inc., publishers of *Computerworld* and *Network World*
CW2

BUY - SELL - SWAP

Here's Everything You Always Wanted From Data General. But Couldn't Get.

We buy, sell and swap Data General gear of all kinds—processors, peripherals, storage, communications, etc.

But we're also authorized distributors for higher-performance DG-compatible equipment like Spectralogic controllers and C. Itoh and NEC printers, as well as for CDC, Fujitsu, Zetaco, MICOM, FACIT, Data Products and Kennedy.

We've got field service at a fraction of DG's prices. And depot service with immediate replacement of defective parts. As well as custom software on request.

Call or write Hanson Data Systems
60 Brigham St., Marlboro, MA 01752
(617) 481-3901
Outside Mass. (800) 225-9215

HANSON
DATA SYSTEMS INC

Data General's Only Single-Source Second Source.

IBM SPECIALISTS

SELL • LEASE • BUY

S/34 S/36 S/38
3741 3742

- New and Used
- All Peripherals
- Upgrades and Features
- IBM Maintenance Guaranteed
- Immediate Delivery
- Completely Refurbished

800-251-2670
IN TENNESSEE (615) 847-4031

ascd MEMBER AMERICAN SOCIETY OF COMPUTER DEALERS

CMA
COMPUTER MARKETING
of America, Inc.

P O BOX 71 • 610 BRYAN STREET • OLD HICKORY, TENNESSEE 37138

3430-A1
Tape & Ctl Unit
4245
2000 LPM Printer

4341's
4381's
Sale/Lease

Printers
4245 4248 3203
3800 3262 3287
Immediate Delivery

Controllers
3880 3274
3803 3276
Display Stations
3278 3178
3279 3179

DASD
3380 3375
3370 3350
Immediate Delivery

TAPE DRIVES
3420 3430
3410 3480
Immediate Delivery

We Buy, Sell & Lease IBM Processors and Peripheral Equipment

Computer Marketing Inc.
P.O. BOX 0, MARGATE, NJ 08402-0430
609/823-6000
Contact/Bernie Gest
Telex: 5106012293

Established 1969

CDLA

3081 - K 32

- — 24 Channels
- — Performance improvement features
- — Available for sale or lease
- — Serial number and physical inspection available

USER INQUIRIES ONLY, PLEASE

AEL **NATIONAL** CDLA

Computer Equipment Corporation
200 Maple Park Boulevard
Maple Park Office Plazo
St. Clair Shores, Michigan 48081

FOR MORE INFORMATION, CONTACT: J. Mloduszewski 1-313-774-7400 1-800-NATCOEC

IBM BUY · SELL · LEASE

SERIES 1
36
38
4300

- Processors
- Peripherals
- Upgrades

DEMPSEY & ASSOCIATES

18377 Beach Blvd Suite 323 • Huntington Beach CA 92648 **(714) 847-8486**

LEAS PAK INTERNATIONAL

BEST PRICE
BEST SERVICE
BEST DELIVERY

WHETHER YOU BUY, SELL, OR LEASE

PRINTERS AND CRT'S

S/34 AND S/38

SYSTEM 36 PROCESSORS AND DISK UPGRADES

LARGE INVENTORY

LEASE FINANCING

LEAS PAK INTERNATIONAL

ascd MEMBER AMERICAN SOCIETY OF COMPUTER DEALERS

P.O. Box 759, Hurst, TX 76053 In Texas call 817/268-0023
1/800/LEAS-PAK

USED COMPUTER COMMUNICATION EQUIPMENT

SIEMENS SD-192MX PBX
Configured for 24 lines/80 stations includes 65 telephones, paging, least-cost routing

TANDEM TNSII COMPUTER
(2) Processors - 2 MB memory each. (2) 240 MB Disc. (2) 128 MB Disc. DSP Magtape 600 LPM Printer. Async/Byte Sync Controllers. Terminals. Software

TANDEM TNSI+ COMPUTER
(2) Processors. 1 MB Memory each (2) 128 MB Disc. MAGTAPE. 600 LPM Printer. Async/Byte Sync Controller. Software

CODEX DNCS 400 NETWORK MONITORING & CONTROL SYSTEM - 52 Port DNP. DG S140 Computer. Software

CODEX MX2400, CS4800 MODEMS (New)

GENERAL DATA COMM DE-3 2400 BAUD MODEMS

RACAL VADIC 300/1200 NESTS/ MODEMS (New)

PRENTICE 300/1200 NESTS/ MODEMS (New)

BUD 42"/77" BLUE CABINETS (New)

MILLIDYNE, INC.
CALL (619) 271-1800

Two Year Lease
3081-G 24 x 24
Available May 15th, 1986

Sale Or Lease
4248-1
Available Immediately

Call Ext. 401
(800) 821-0229
(818) 986-2411
In California

El Camino Resources

For Sale

By The
Christian Broadcasting Network Incorporated

(1) Scan Optics Model III Optical Scanner System

Includes
* Terminals
* Edit & Alphanumeric Hand Print Module
* Character Recognition Logic
* Supervisory Console, And
* (3) 9-Track 1600 BPI Tape Drives

Also

(2) General Instrument Checkmate II Workstations

For More Information
Contact Michael Goding At
(804) 424-7777 Ext 3121

Inflation Fighters

Quality & Savings

Slightly used, Money Back Guarantee. Full Reels. All External Labels Removed Guaranteed for use at 1600 BPI through 6250 BPI.

2400' Reel	**$4.95 ea.**
1200' Reel	**$4.50 ea.**
600' Reel	**$3.75 ea.**

All Tapes with Hanging Seals

We pay freight on orders over 200 tapes.
All orders shipped within 48 hours.

Call or Write

Computer Tape Mart
44A Seabro Avenue
N. Amityville, New York 11701
[516] 842-8512

DEC EQUIPMENT

★ Immediate Delivery
★ Fully Guaranteed
★ Lowest Prices

701-282-8380
ESS COMPUTER
123 E. MAIN
WEST FARGO, ND
58078

Want To Buy
Or Sublease

3380 Disks

All Models

Call Ext. 401
(800) 821-0229
(818) 986-2411
In California

El Camino Resources

---

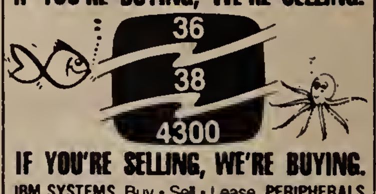
(2) **Bytronix** 5000
Minicomputers
(2) **Venus** IO
Controller Boards
(1) **CDC** FSD 160 Mg
Fixed Disk Drive
(2) **Lark** 50 Mg Disk Drives
(1) **Cabinet**
Which Houses Both Minis
Best Offer
May Be Purchased Separately
(203) 288-6461 Ask For Bruce

3704
3705 3725
BUY • SELL • LEASE

Call Toll-Free
800 532-7532
In Minnesota Call 612/944-9161

Centron DPL Company
Member CDLA

IF YOU'RE BUYING, WE'RE SELLING.



IF YOU'RE SELLING, WE'RE BUYING.

IBM SYSTEMS Buy • Sell • Lease PERIPHERALS

(800) 331-8283
TOLL FREE
(213) 306-9343
CALIFORNIA

Ocean Computers, Inc.
8055 W. Manchester Ave., Ste 525
Playa Del Rey, CA 90293

IBM
HARDWARE
BUY • SELL • LEASE

SERIES-1
S/34 • S/36 • S/38
S/23 • 4300 • POS

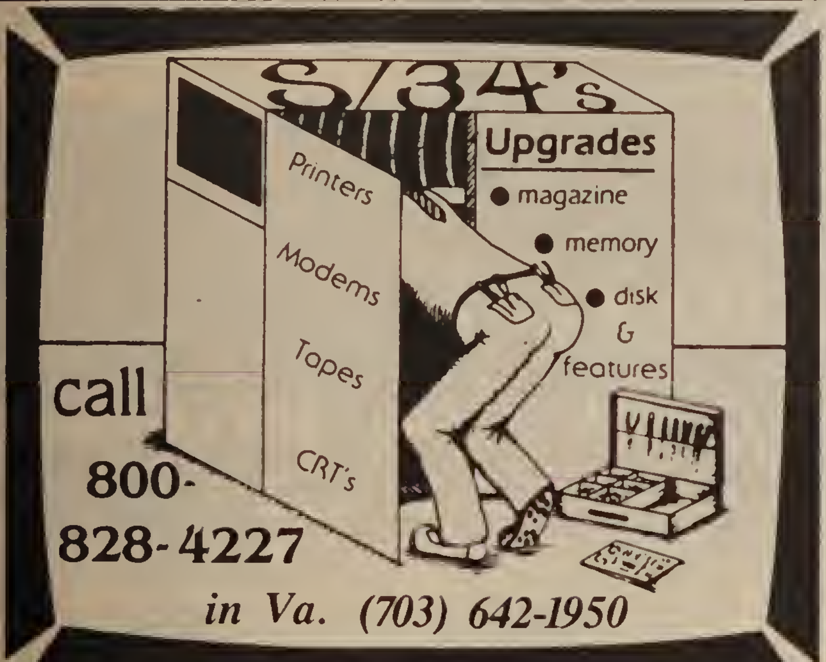
AMCOM
CORPORATION
5200 W. 73RD ST
MINNEAPOLIS, MN 55435
612-835-4737 **800-328-7723**

IBM SYSTEMS, PERIPHERALS, UPGRADES

SYSTEM 36
SERIES/1
SYSTEM 38
SYSTEM 34
PC, XT, AT
4300/3080
DISPLAYWRITERS
DATAMASTERS S/23

BUY, SELL, LEASE **612/894-2200** BUY, SELL, LEASE
ALSO: FINANCE & OPERATING LEASES FOR ALL SYSTEMS & PERIPHERALS.

Valley Computer
& Financial, Inc.
12205 Nicollet Avenue, Burnsville, MN 55337



call
800-828-4227
in Va. (703) 642-1950

CARLYN
COMPUTER SYSTEMS
5105Q BACKLICK ROAD, ANNANDALE, VA 22003

BUY • SELL • LEASE • TRADE

800-423-8436

S/34 - 36 - 38
- All Upgrades Available Now
- All Models and Peripherals

5110, 5120, DATAMASTERS

4331/4341
4361/4381
All Peripherals

LSC
LONE STAR
COMPUTER
CORPORATION

Series/1
Peripherals IBM - CDC
Configured to Your
Specifications

SUITE 330
18601 LBJ FREEWAY
MESQUITE, TEXAS 75150
IN TX 214/681-7871

MEMBER AMERICAN SOCIETY OF COMPUTER DEALERS

What

WHAT SHOULD YOU LEASE?
WHAT SHOULD YOU BUY?
WHAT SHOULD YOU SELL?
WHAT SHOULD YOU TRADE?
WHAT SHOULD YOU UPGRADE?

WHEN YOU WANT ANSWERS, CALL US

WE BUY · SELL · LEASE
34 · 36 · 38 · SERIES 1 · 4331-4381
ALL PERIPHERAL EQUIPMENT
ALL UPGRADES
SOFTWARE & DATA COMMUNICATIONS CONSULTING

CALL: 800-238-6405
IN TN: 901-372-2622
IN NC: 919-884-0879

CB
COMPUTER BROKERS INC.
2978 SHELBY ST.
MEMPHIS, TN 38134
"SINCE 1974"

If Data General makes it...NPA

- SERVICES
- SELLS
- TRADES
- LEASES &
- PURCHASES IT!!!

Data General®

Specializing in field service, depot repairs & upgrades.

NPA will not compromise on quality, customer satisfaction or total solution but our pricing is always negotiable.

NPA Systems Inc
761 COATES AVE., HOLBROOK, NY 11741
2322 FIFTH ST., BERKELEY, CA 94710

NPA Systems, Inc
NEW YORK
516-467-2500

NPA Systems, Inc of
CALIFORNIA
415-848-9835

TELEX 510-222-0880

★ Buy ★ Sell ★ Lease
Up to 40% SAVINGS on
IBM. Displaywriters

Guaranteed Acceptable for IBM Maintenance
FEATURES & UPGRADES
5215-5218-6361
SYSTEM /23 DATAMASTERS
6670 PRINTERS
5525 OFFICE SYSTEMS
5219-5253-5258
SYSTEM/34/36

CDB FINANCIAL, INC.
3520 DILIDO ROAD
DALLAS, TEXAS 75228
214—324-3491
Member: NOMDA-CDLA

END USER DESIRES TO BUY

HP3000 Model 68 w/4MB Memory or
HP 3000 Model 48 w/2MB Memory

Minimum configuration includes:

(1) System Interface Board
(2) GIC's
(1) HP 7933 Disk Drive
(36) ATP or ADCC Ports

Please call or write to:

John Churyto
MIS Manager
Daniels & Associates, Inc.
2930 E. Third Ave.
Denver, CO 80206
(303) 321-7550

RANDOLPH MIPS OF THE MONTH

MAY 1986 Copyright 1986 Randolph Computer Corporation

IBM

SYSTEMS	MIPS (Millions of Instructions Processed Per Second)	MEGABYTES	SYSTEMS	MIPS (Millions of Instructions Processed Per Second)	MEGABYTES
4331-1	0.25	0.5 to 1	3033N	4.3	4 to 16
4331-11	0.38	1 to 2	3038EX	4.4	8 to 32
4331-2	0.50	1 to 4	4381-3	4.5	8 to 32
4341-9	0.52	1 to 4	3033UP	5.0	4 to 24
4361-3	0.70	2 to 4	•4381-14	6.0	16 to 32
4341-10	0.75	2 to 4	3083B	6.3	8 to 32
4341-1	0.88	2 to 4	3083BX	6.6	8 to 32
4341-11	1.1	2 to 8	3083J	8.4	8 to 32
4361-4	1.15	2 to 12	3033MP	8.5	8 to 32
3031	1.2	2 to 8	3033AP	8.5	4 to 24
4361-5	1.45	2 to 12	3033JX	8.8	8 to 32
•4381-11	1.4	4 to 16	3081D	10.0	16 to 32
4341-2	1.5	2 to 16	•3090-150	10.1	32 to 64
4241-12	1.65	2 to 16	3081G	11.0	16 to 48
3031-AP	2.0	2 to 8	3081GX	11.9	16 to 64
4381-1	2.1	4 to 16	3081K	14.0	16 to 48
3032	2.5	2 to 8	•3090-180	15.4	32 to 320
4381-2	2.7	4 to 32	3081KX	15.5	16 to 64
•4381-12	2.7	8 to 32	3084G	26.6	32 to 96
3033S	2.9	4 to 16	3084QX	28.7	32 to 128
3083CX	3.3	8 to 32	3090-200	29.4	64 to 320
•4381-13	3.6	8 to 32	•3090-400	52.9	128 to 640
3083E	4.2	8 to 32			

• First Installation 1986

AMDAHL

SYSTEMS	MIPS	MEGABYTES
470V 7	5.5	8 to 32
470V/8	6.5	8 to 32
5840	8.4	16 to 64
5850	11.6	16 to 64
5860	14.0	16 to 64
5867	22.0	24 to 64
5868	22.0	32 to 128
5870	26.6	16 to 64
5880	26.6	32 to 128
†5890-200	28	64 to 256
†5890-300	38	64 to 256
†5890-600	64	128 to 512

NATIONAL ADVANCED SYSTEMS

SYSTEMS	MIPS	MEGABYTES
AS 8043	5.2	8 to 32
AS 8053	6.5	8 to 32
AS 8063	8.4	16 to 32
AS 9040	7.2	8 to 48
AS 9050	9	8 to 48
AS 9060	11.2	16 to 64
AS 9070	16.2	16 to 64
AS 9080	20	16 to 64
†AS XL-60	28	32 to 256
†AS XL-80	50	64 to 256

† First Installation 1986

The above information is intended as a guideline for computer users on relative computer system instruction cycle times. All data have been derived from published documentation and represent reasonable estimates of average MIPS ratings. However, Randolph is not responsible for the accuracy of the MIPS data. Cycle times will vary based on hardware software configurations, and system manufacturers continually modify computer models as design improvements in hardware and software arise.

TALK TO RANDOLPH NOW. Whatever your computer system needs, Randolph can deliver the hardware when you need it . . . and ease the pressure on your DP budget with low lease rates. Call 800-243-5307, in CT 203-661-4200.

Randolph

CDLA
Randolph Computer Corporation
Subsidiary of Bank of Boston • 537 Steamboat Road, Greenwich, CT 06830

Providing the BEST a BETTER WAY.

ECONOCOM-USA IS PART OF THE ECONOCOM CORPORATION — A WORLDWIDE LEADER IN THE DISTRIBUTION OF COMPUTER RELATED PRODUCTS AND SERVICES. OUR GLOBAL STRENGTH ENABLES US TO PROVIDE AN EXTREMELY HIGH LEVEL OF CUSTOMER SERVICE THROUGH OUR OFFICES LOCATED ACROSS THE UNITED STATES AND EUROPE. IN MANY INSTANCES, WE'RE RIGHT IN YOUR OWN BACK YARD.

WE OFFER...

- THE COMPLETE IBM* PRODUCT LINE, INCLUDING S/38, S/36, S/34, PC, SERIES/1, 43XX, 308X, 309X, PLUS ALL ASSOCIATED PERIPHERALS.
- OTHER COMPUTER AND COMMUNICATIONS EQUIPMENT INCLUDING IBM* PLUG-COMPATIBLES, AT&T*, AND BURROUGHS *
- BUY-SELL-LEASE/NEW OR USED WITH COMPLETE FINANCIAL SERVICES
- SERVICE PLUS! COMPUTER MAINTENANCE PROVIDED BY THE IBM-TRAINED FIELD ENGINEERS AT ECONOCOM MAINTENANCE COMPANY, INC.
- THE ECONOCOM PERIPHERAL LINE OF IBM* PLUG-COMPATIBLE EQUIPMENT

PLUS...ECONOCOM CONTINGENCY SERVICES · A COMPANY WHICH SPECIALIZES IN CONTINGENCY PLANNING SERVICES AND DISASTER RECOVERY CENTERS FOR IBM* SYSTEM/38 INSTALLATIONS

Member
CDLA Computer Dealers & Lessors Association
AAEL AMERICAN ASSOCIATION OF EQUIPMENT LESSORS
ASCD AMERICAN SOCIETY OF COMPUTER DEALERS

At ECONOCOM-USA, we provide you with the BEST products and services available today...a BETTER WAY. Please contact our office nearest you for specific examples.

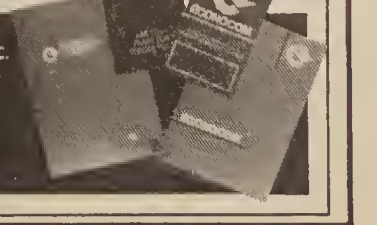
ATLANTA (404) 399-0732	CHATTANOOGA (615) 877-0283	HOUSTON (713) 789-0800	LOUISVILLE (502) 589-1376	NEW YORK (212) 432-1441
BIRMINGHAM (205) 823-6568	DALLAS (214) 891-3182	KANSAS CITY (913) 491-8939	MEMPHIS (901) 767-9130	ORLANDO (305) 767-9416
BOULDER (303) 449-1958	DALLAS (214) 256-6563	LITTLE ROCK (501) 224-6242	MIAMI (305) 755-4949	RALEIGH (800) 238-3098
CHARLOTTE (704) 523-5508	DENVER (303) 893-1511	LOS ANGELES (714) 852-0831	NASHVILLE (615) 386-7019	TULSA (918) 493-5015

SEND US YOUR BUSINESS CARD AND WE'LL SEND YOU A COPY OF OUR CAPABILITIES BROCHURE, COMPUTER MARKET ADVISOR, *SERVICE PLUS!* BROCHURE AND ECONOCOM CONTINGENCY SERVICES PACKET.

IN ADDITION, THE ECONOCOM CORPORATION HAS 31 OFFICES THROUGHOUT EUROPE.

ECONOCOM USA

ECONOCOM-USA, INC.
845 CROSSOVER LANE
MEMPHIS, TN 38117
800-238-3098
OR 901-767-9130



BUY SELL SWAP BUY SELL SWAP

IBM... 34, 36, 38, 4300

- BUY
- SELL
- LEASE

(Short or Long Term)

UPGRADES
PRINTERS
CONTROLLERS
TAPES
DISKS
TERMINALS
FEATURES

- Guaranteed for IBM Maintenance
- Immediate Delivery
- Competitive Prices

ICS...

CALL TOLL FREE
800 258-2233

INTERNATIONAL COMPUTER SALES, INC. • 515 E. 1st ST., SUITE A • TUSTIN, CA 92680 IN CALIFORNIA (714) 838-3717

** ATTENTION **
Available for Lease

IBM

3800-001 Laser Printer
3890-A04 Document Process.
3705 - 3706-J02 Communica Contrl
3370-A1&B1 Direct Access Storage

INTEL

3805-002 Paging Device

commonwealth capital corp.

Call for Details
215-576-1755
George or Sandra

AEL

BUY SELL SWAP

THE SOURCE FOR series/1

ECONOCOM

• BUY • SELL • LEASE
NEW OR USED

ECONOCOM-USA, INC.
845 CROSSOVER LANE
P. O. BOX 240297
MEMPHIS, TENNESSEE 38124
(901) 767-9130 or
(800) 238-3098

CDLA Member Computer Dealers & Lessors Association

Member AEL American Association of Equipment Lessors

Sell IBM S/1 34 38 36
UPGRADES
Lowest Prices

Call Collect
404-475-7507

DATAMARC
785 Branch Drive
Alpharetta, GA 30201

We Pay Highest Prices For S/34's

BUY SELL SWAP

We Buy & Sell
DEC
Systems Components

Digital
Computer
Resale

call:713 445-0082
600 Kenrick Ste C22
Houston, Tx 77060

Computer Room Furnishings

(7) **Wright/Line Tape Cabinets**,
84" With Tambour Door
In Excellent Condition
Original List Price $585. Make Offer

(4) **Wright/Line Disk Pack Cabinets**,
7 Roll Out Shelves
Original List Price $984.

All Cabinets Olive With Black Accent

(8) **CRTs Lier Siegler ADM-3AL**,
Recently Replaced & As Is
Make Offer

Call Or Write
Warren Beatty, Inslaw Inc,
1125 15th St. NW, Washington,
DC 20005, (202) 828-8600

3081
K32x24

24 Month Lease Only

Call Ext. 401
(800) 821-0229
(818) 986-2411
In California

El Camino Resources

BIDS & PROPOSALS

STATE OF CONNECTICUT
D.A.S. BUREAU OF PURCHASES
REQUEST FOR PROPOSAL (R631)
REFERENCE: RFP R631

RFP for a Child Support Enforcement System in accordance with Information Memorandum OCSE-IM-83-5, September 13, 1983 and the new requirements established by Public Law 98-378. Vendors must have an established operational system in order to respond.

Such system must satisfy requirements prescribed in 45CFR Part 307.10 and be approved in accordance with Part 307.15.

Anticipated issue date 5/23/86.

Interested vendors must contact:
Gordon L. Partridge, Director
State Of Connecticut
Resources & Facilities Planning
340 Capital Avenue, 1st Floor
Hartford, Connecticut 06106
(203) 566-3304

John W. Otterbein
Deputy Commissioner

Place your ad for BIDS & PROPOSALS here.

Call 1-800-343-6474
or (in Mass.)
(617) 879-0700

The Bulletin Board

Buy • Sell • Lease Buy • Sell • Lease Buy • Sell • Lease Buy • Sell • Lease

MISC. SYSTEMS

Atlanta Company Surplus
Data 100
Key To Batch System
Tape Drive, 400 LPM Printer, 12 CRTs, Card Reader, Multiplexor 4800 Baud
Other Equipment
Micro Fiche Readers,
Terminals And Modems
Contact Beth (404) 992-8119

Distress Sale
Atlanta Company Surplus
McDonnell Douglas
Sequel 9000
Pick System 520 Mb Disk Drive, 1 Meg Main Memory, 600 LPM Printer, 150 LPM Printer, Multiplexors 4800 Baud, 12 Terminals
Only 18 Months Old
Contact Beth (404) 992-8119

BURROUGHS

BUY SELL LEASE
BURROUGHS

B-20 to B-7900

SPECIAL 207 DISK
(10 Units)

B900 DISK PACK (206 Style)
Subsystem

DEPOT MAINTENANCE

Computer Provisions
(216) 248-7878

BURROUGHS

BURROUGHS
BUY ● SELL ● LEASE

Systems * Processors * Peripherals

- All BX800 & BX900 Series
- All "A" Series
- All Peripherals
- All Terminals
- All Convergent Technology

"May Specials"

B20-B21-B22-B25-B26 etc.
B9246-21 & -20 Printers
B6930-B5930-B1985
B9246-6 & -3 Printers
Depot Maintenance
206 Disk Drives

Universal Financial
1-800-558-5656

HONEYWELL

HONEYWELL SPECIALISTS
LEVEL 6 DPS 6 SERIES 16

The Recognized Leader
In Honeywell Minicomputer
Sales And Support

- Complete Minicomputer Line - New and Used
- All Peripherals and Terminals
- Upgrades and Features
- Depot Repair Capability
- Honeywell Maintenance Guaranteed
- Immediate Delivery - Low Prices
- Complete Refurbishment

617-393-6839
TWX 710-347-7574
Boudreau Computer Services
Since 1974
100 Bearfoot Rd.
Northboro, Massachusetts 01532

HONEYWELL

LEVEL 6 AND DPS6 USERS
NEW AND RENEWED ORIGINAL

Systems - Peripherals - CRT's
Memory - Controllers - Cables
Guaranteed Honeywell Maintenance
Large software staff
C.D. Systems Inc.
1-800-331-2310

DATA GENERAL

Systems

MV10000 16Mb AOS + ADA	Call
MV8000-II 8Mb AOS	Call
MV4000 2Mb AOS	$21,000
C-350 256Kb	$4,100
M600 512Kb	$4,900
S-20 System	Call
MP-100	$600
8745 BBU-MV8000-II	$3,200
8746-B Expansion Chasi BBU	$3,200
8762 Exp. Chasi MV4000/8/10	Call

Memories

MV4000 2Mb, 4Mb, 8Mb	Call
MV10000 2Mb, 4Mb, 8Mb	Call
MV8000 2Mb	$3,900

Disks

6161 S/S 147Mb	$9,800
6161-A 147Mb	$8,200
6160-A 73Mb	$7,000
6061 S/S 192Mb	$6,500
6122 S/S 277Mb	$8,500

Comm/CRTs

D211 New	$875
D200	$475
IAC-16 with TCB	$4,600
IAC-8 with TCB	$3,900
ATI-16	$1,900
AMI-8	$1,100
ALM-16	$1,050

Int'l Computing Systems
(612) 935-8112

DATA GENERAL

NEW D.G. C.R.T.'s

D214	595.	D411	895.
D215	675.	D461	1125.

Lowest prices on all MV-2000s, DESKTOPS, MEMORY BOARDS & MULTIPLEXERS.
ALPHA-KENCO, INC.
1-800-44-KENCO
New York State: 718-633-2800
Formerly Kenco Data Systems

Your Ad
Could Be Here
For
$160.00

WANG

BUY - SELL
MVP/LVP ● OIS ● VS ● PC
SYSTEMS IN INVENTORY
VS-45 ● OIS ● VS-100
GENESIS
EQUIPMENT MARKETING
GEM
(602) 277-8230

THE RIGHT EQUIPMENT
RIGHT NOW
AT THE RIGHT PRICE
ICA..THE RIGHT CHOICE

founded 1981 by ex-Wang employees
(404)977-4388 or (800)241-3159

WANG

Buy ● Sell
Used
Wang Equipment
Guaranteed For Wang Maintenance
Holson Associates Inc.
2470 Windy Hill Road, Suite 253
Marietta, GA 30067
Call: Richard Holley
or Carole Benson
(404) 980-1700

MISC.

NEW & USED
RAISED FLOORING
Immediate Delivery
Quality Installation
RAISED COMPUTER FLOORS
One Charles Street
Westwood, NJ 07675
(201) 666-8200
Telex #13-5076

COMPUTER SITE EQUIPMENT
Flooring, A/C, Chillers,
M/G, UPS, Monitor
Buy/Sell/Lease
612-944-8570

MOHAWK
DATA SCIENCES
2100 Series Computer
(3) 2192 CRTs, 2 Diskette Drives, 256K Memory, 20 MB Disks.
Call Darold Peterson
(812) 332-4585

MISC.

SALE OR LEASE
1985 ROLM CBX II 9000

131 Lines, 527 Stations, Still Under Warranty, 2 Nodes, includes all hardware for data transmission; T1-D3 Interface and Phonemail for 350 users.

Contact Darleen Coppersmith
(415) 475-3223

HEWLETT PACKARD

HP3000
BUY * SELL * RENT * LEASE
Processors * Peripherals * Systems
Disc Drive Special
7925S
120 Mb Slave Disc Drive
$3,250.
Offer Expires May 15, 1986
Immediate Delivery
Subject to Availability
Guaranteed to Qualify
for HP Maintenance
ConAm Corporation
(800) 643-4954 (213) 829-2277

HP 1000 ● 3000
Systems & Peripherals
Buy & Sell Worldwide
ENCORE
(213) 452-9117
Telex 756927

NCR

NEED A MICR SORTER?

3 year old NCR 6780, 24 pockets with micro filmer and endorser.

Save 60% over new

Call (717) 476-2925
Dave Binkley

DEC

FIRST ON DEC FOR SALE

DEQNA-M	$ 875
DEUNA-AA	2,800
DFO3-RC	475
DFM16-AC	3,600
DMP11-AD	2,975
DR11-W	1,350
H9652 MA	2,450
LA120 BA	1,250
MICROVAX II's	CALL
PRO350 D2	2,700
RA81-AA	12,500
RA81-ED	42,000
RP07-AA	New 12,000
RUA81-EA	45,920
VT220	New 745
VT240	1,680
VT240 DEMO	1,075

WE ALSO BUY VAX HARDWARE!!

CALL

(800) 222-ICEX
(303) 666-5400

ICEX, INC.
740C SOUTH PIERCE AVE.
LOUISVILLE, CO 80027

DEC NEW & USED

BUY - SELL - EXCHANGE

Systems ● Processors ● Memory Options ● Peripherals ● Modules

LAKEWOOD COMPUTER CORP.
452 Link Lane
Ft. Collins, CO 80524
(303) 493-6406

DEC

Merida Trading Group

New

RA81AA	$12,500
RA60AA	$12,500
RA81JA	$52,000
750 Memory	$1,450
780 Memory	$1,450
MS11TB	$1,300
VAX 750 CPU *Used*	Call
VT220 A, B & C *Recon.*	$750
Used 750/780 Memory	$1,000
H9642 Cabinets (2)	$1,000

155 New Boston Street
Woburn, MA 01801
(617) 933-6790

DEC SPRING SPECIALS

11/34A CPU Set	$750
11/44 CPU Set KD11Z	$3,900
DL11-W	$185
FPF11	$875
FP11A	$695
HSC5X-BA	$4,450
KK11-A	$475
MF20-M	$4,400
MS11-LD	$375
MS11-MB	$375
MS630-BA	$2,900
MSV11-PL	$695
VAX 4MB MS780-JD	$5,900
VAX 4MB MS86-BA	$12,700

Call Ray at QEI, Inc. (617) 275-6800

MICRO VAX II

FOR RENT

3MB/RDS3/TKS0/RXS0/8-USER, LIC.

IMMEDIATE AVAILABILITY

BROOKVALE ASSOCIATES
516-273-7777 800-645-1167

BUY • SELL • TRADE

- 11/84-BA
- 1170 CPU st
- 1172S
- BC26V-S0
- BC26V-80
- H7140-AA
- LA120-BA
- MS11-PB
- MS7S0-CA
- MS780-CH
- MS780-FA
- MSV11-JC
- MSV11-PL
- MSV11-QA
- MSV11-QC
- RLV12
- TU80-AA
- UDA50-A

NEW YORK COMPUTER EXCHANGE
(516)752-8666 (800)645-9109

DEC

11/780's - 3 Yrs. Old

Will upgrade, if desired
3 MB, RP07-AA, RP07-BA, TU78, FP780-AA, More.
Continuous DEC Maintenance
Available Immediately
By Owner (617) 631-3833

IBM

IBM

3420-6
Available now for sale or lease

3803-2
Available now for sale or lease

4341-12
Available now -
One for sale or lease
One for lease only

Call Pete -
(313) 254-2850

The Vargo Companies

48945 Van Dyke
Utica, MI 48087

Member of CDLA & DDA

SERIES/1

BUY - SELL - LEASE

New, Used, CDC, Features

Xerxes Computer Sales
800/328-3884 612/936-9280

IBM

BUY OR SUBLEASE
3083 Model E

WANT TO SELL
3420 Model 8
Tape Drives

Call Pete Mitchell
(312) 322-6226
No Brokers Please

IBM
3178, 3179, 3278, 3274
All Other IBM Units Available
Call Penny 800/426-4341
In CA 408/241-3677
Marketex Computer Corp.

S/38 S/36 S/34 SERIES 1

BUY - SELL - LEASE

Systems, Peripherals & Upgrades

Source Data Products
408/425-7333 800/328-2669

34-36-38

Systems,
Peripherals & Upgrades
Guaranteed Quality Service
Special Reduced Prices
New and Used Equipment
Carlyn Computer Systems, Inc.
800-828-4227
In VA (703) 642-1950

S/38

Memory Upgrades

Immediately Available
EMC Or IBM
(713) 627-7117
(212) 279-4467

SALE/LEASE
3380-AA4
3380-B4 3880-3
w/8170
Call Howard King (914) 238-9631
Computer Merchants Inc.

IBM

Sale/Lease
IBM 4331
Model K11
With 3278 Console
Call Tom Trechel (305) 662-5196
Hallmark Insurance Group

SALE/LEASE
S/36-B23
S/36-B24
Peripherals To Suit
Call Louis Felder (914) 238-9631
Computer Merchants Inc.

Want To Buy System 38 System 36

(713) 627-7117

WANTED
S/38
Models 8, 20 Or 40
Call Ron Gibb
(914) 238-9631
Computer Merchants Inc.

For Sale Or Lease
3279-S3G
3375 1x3 String
Bluebonnet Computer Co.
(512) 926-3900

Fox Computer Sales
Buy • Sell • Rent • Lease
IBM
DP & GSD
W.T.B.: Used Equipment
(216) 449-5205

IBM

FOR SALE
SYSTEM 36-B23

5225 Printer, 5 Display Stations plus 1 Remote Display Station.

Call Sy Wegbreit
(201) 935-6470

S/38

Model 18 - 4 Mb
Immediate Availability
Must Sell Or Lease
Source Data Products
408/425-7333 800/328-2669
Call Bob Losey

FOR SALE
IBM

(1) 3880-1	(2) 3370-A1's
(2) 3370-B1's	(1) 3203-5

Call Chuck Nicholls
Niagara Frontier Services Inc.
716 827-3266

PRIME

LARGE SELECTION OF USED PRIME COMPUTER SYSTEMS
...SAVINGS TO 50%
Peripherals also available
1st SOLUTIONS, INC.
2001 EAST CAMPBELL AVE.
PHOENIX, ARIZONA 85016
(602) 957-0999
ASK FOR DON OR MATT

TSI - the oldest, largest and most experienced supplier of third party peripherals, memories and controllers for Prime users.

BUY ● SELL ● LEASE ● RENT

NATIONAL	800-222-DISK
FLORIDA	800-421-413S

Timesharing Services, Inc., 4080 Woodcock Dr., Jacksonville, FL 32207

SOFTWARE FOR SALE

FINALLY... A SYSTEM THAT EARNS ITS KEEP!

SYSTEM HIGHLIGHTS:
- Automatic P.O Generation
- Interactive On-line System
- Vender Performance · On-line
- Item Performance - On-line
- Complete Reporting Functions
- Programs are all Multi-user
- Full Source Code and Documentation
- System Support "Hot" Line
- System Education Provided
- Easily Installed on **SYSTEM 34/36**
- 5 Decimal Position Cost Fields
- Alpha Search Capabilities by Item or Vender
- Detail History of Past Purchase Orders
- And much more ..

SUCCESSFUL SYSTEMS INNOVATORS, INC.
35-48 172nd Street, Flushing, New York 11358
(718) 539-2118

Set up a complete graphics workstation on your PC for under $100!

MicroPlot's enhanced PC-PLOT-III graphics emulator software package enables IBM PC and compatibles to appear to a mainframe as a DEC VT-100/VT-52, a Retrographics VT-640, a Tektronix 4010/4014 or a partial Tektronix 4027 Over 12,000 copies are currently in use world-wide at major corporations, educational facilities, research labs and independent consulting firms

For more information call toll free 1-800-338-0333, Ohio call 1-800-242-0333 Give operator this ID number: 766-8501

MicroPlot™

659-H Park Meadow Road
Westerville, Oh 43081 614/882-4786

maxell.
5¼" SS/DD **$.64**

OTHER BRANDS AS LOW AS $.54

BULK DISKETTES-QUANTITIES OF 500 with TYVEK SLEEVES

RIBBONS (All Brands)
EPSON MX 70/80 **$4.20**
Prices based on quantities of 48

C.O.D. C.O.D.
800-222-0490
201-462-7628 In N.J.

MEGAsoft P.O. Box 710, Freehold, N.J. 07728

Award-Winning

Featuring:

- *Unsurpassed Documentation*
- *Large Scale Integration*
- *User-Defined Vocabulary*
- *Paperless Processing*

General Accounting	*Job Cost Accounting*
Accounts Payable	*Payroll/Personnel*
Accounts Receivable	*Inventory Management*
Equipment & Fixed Assets	*Order Processing*
Financial Reporting	*Sales Analysis*
Planning & Budgeting	*Oil & Gas Accounting*

J.D. Edwards & Company

4949 S. Syracuse / Suite 5500
Denver, CO 80237
303/ 773 3732

IBM® Value Added Remarketer

New York — 201/ 348 8989
Dallas — 214/ 458 0636
Houston — 713/ 880 8278
San Francisco — 415/ 571 5755
Newport Beach — 714/ 955 0118
Tulsa — 918/ 493 1477

Computerworld CLASSIFIEDS

Our business is to help you improve yours--

via programmers, analysts, engineers, terminals, printers, software packages, computer time, computer services, office space, advertising for seminars & conferences, business opportunities,

AND.....**exposure to an audience of over half a million readers NATIONWIDE.....EVERY WEEK.**

TIME & SERVICES

DATA CENTER SERVICES

- ★ MILLENNIUM
- ★ OS/MVS/SP
- ★ VM/370
- ★ DOS/VSE/SCP
- ★ CMS
- ★ NOMAD2
- ★ TSO/SPF
- ★ CICS
- ★ IMS/DBDC
- ★ RJE
- ★ TELENET ACCESS

Info Center Products
Access By Micros

EXCELLENT SERVICE LEVELS
COMPETITIVE RATES
VOLUME DISCOUNTS

BURNS COMPUTING SERVICES, INC.

MIDWEST:	EAST COAST:
312/981-5260	215/398-3600 212/432-1151

MILLENNIUM is a registered trademark of McCormack & Dodge

NOMAD2 is a trademark of D&B COMPUTING SERVICES INC

Litton Computer Services
FULL SERVICE COMPUTING
IBM LARGE SCALE MAINFRAMES

EXTENSIVE SOFTWARE SERVICES:

MVS
VM/CMS
TSO/SPF
CICS
DOS
RAMIS II
GRAPHICS
MICRO/MAIN FRAME LINK
DBMS
PROFS

NETWORK ACCESS
RJE
STATISTICAL PACKAGES

SUPERIOR TECHNICAL SUPPORT
HIGHLY COMPETITIVE RATES

NEW YORK (212) 972-7880
CHICAGO (312) 298-9305
WASHINGTON (703) 471-9200

OR FOR MORE INFORMATION WRITE OR CALL:
6 Kingsbridge Road
Fairfield, New Jersey 07006
Attn: Dominick Ciminello
(201) 575-2800

COMPUTER TIME RENTAL

IBM 4331
DOS/VSE - ICCF
All Shifts Available
3370 Disk, 3420 Tape
800/1600 Density
1403-N1,
2540 Reader/Punch

Reasonable Rates

Contact: Al Palmo
Restamatic Data Services
(212) 997-1439

VAX TIME

CHOOSE THE PLAN BEST FOR YOU
A @ 5¢ CPU SEC & $2 CONNECT HR
B @ $12 PER CONNECT HOUR
C @ $800/MONTH & 10 MB DISK

NO CPU CHARGES ON PLANS B & C.
PROGRAMMING SERVICES AVAILABLE

AVAILABLE NATIONWIDE VIA TELENET

MIDCOM CORPORATION
(714) 99VAX11
(714) 998-6041

MVS - VM - DOS

ROSCOE IMS

computer time

201-930-0051
212-921-8855

tbi
TIME BROKERS, INC.

WYLBUR IDMS

CICS - TSO - CMS

ICOTECH
Innovative Computer Techniques
DATA PROCESSING SERVICES
IBM 3081 DEC-10 VAX 8600

- Batch Processing
- Timesharing
- Microfiche
- Public Network Access
- Laser Printing
- Optical Mark Reading

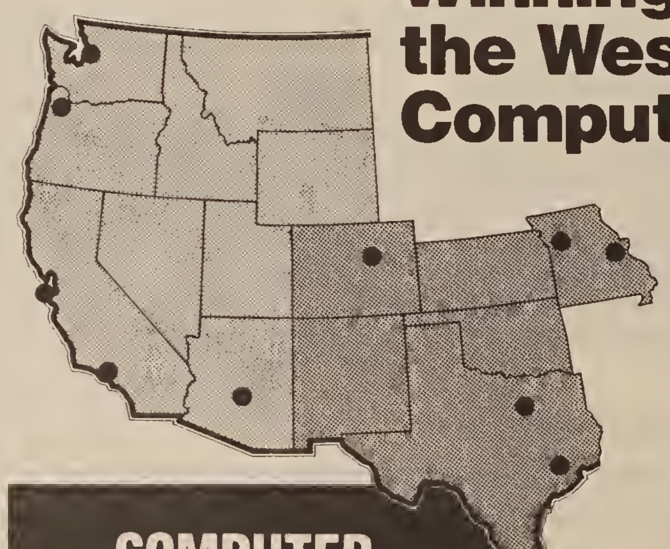
Introducing . . .
the ICOTECH
Health & Safety Information System
Route 202 • Raritan, N.J. 08869
201-685-3400 • Contact: Joyce Bogaenko

Researching all your options will show you that your best source is
COMPUTERWORLD

POSITION ANNOUNCEMENTS

FULL-TIME CHALLENGES

Winning the West with Computer Task Group



We're CTG, the nation's largest independent software services firm. Because we work primarily with Fortune 500 companies, we're also the nation's foremost provider of career opportunities for systems professionals. Our branch facilities have expanded to 48 cities and annual revenues now approach $150 million.

Our expanding list of clients has created challenging assignments for **Project Leaders, DBA's, Systems Analysts** and **Programmers.** We currently offer opportunities with the following technical skills:

• IBM • VAX • TANDEM • H.P. • HONEYWELL
• IMS • DB/DC • IDMS/ADSO • ADABAS • DL-1
• CICS • COBOL • PL-1 • SAS • FOCUS

We would also like to talk with growth-minded professionals with IBM DBMS experience who have an interest in learning Cullinet IDMS at our in-house educational facility.

The greatest benefit CTG offers you is our commitment to help our people reach their long term career goals. Find out for yourself about the unique career options, technical training, lifestyles and attractive compensation and benefits packages that await you as you win the West with CTG. Come and grow with us.

COMPUTER TASK GROUP, INC.
CTG

For positions in the Bay Area, Los Angeles, Phoenix, Seattle and Portland, contact: Jim Roberts

CTG Western Regional Staffing
2420 Camino Ramon, Suite 225
San Ramon, CA 94583
(415) 833-0545

For positions in Dallas, Denver, Houston, Kansas City or St. Louis, contact: Anita Rapp

CTG Southwest Regional Staffing
6500 S. Quebec St., Suite 350
Englewood, CO 80111
(303) 770-8833

An Equal Opportunity Employer Not an Agency

> "We have it in our power to begin the world over again"
>
> —Thomas Paine
> American Political Philosopher and Author

You have it in your power to change your world—your career and your lifestyle by contacting TRW's Operations and Support Group in Southern California.

Forget the swaying palm trees, beautiful beaches and snow capped mountains. Although much of it's true, let's forget all the hype about Southern California. Let's talk about your career and opportunities at TRW.

You can be part of a team that is designing and developing the systems of the future if you're an IDMS professional with a Bachelor's degree and at least 2 years experience. Tomorrow is taking shape at a company called TRW.

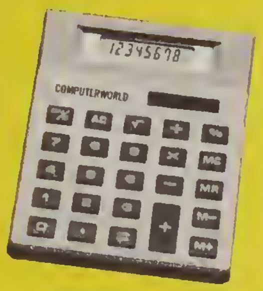
- **IDMS ADS/O Programmer Analysts**
- **IDMS Data Base Administrator**
- **IDMS Software System Test Planner**
- **IDMS Senior Systems Analysts**
- **IDMS C-SPEC Project Leader**

TRW offers excellent salaries and benefits including medical/dental/vision care coverage, liberal stock savings program, flexible hours, and a fabulous Southern California lifestyle. Please forward your resume with salary history to: **TRW O&SG, R. Chambers, E1/4029, One Space Park, Redondo Beach, CA 90278, Attn: Dept. CW.**

Equal Opportunity Employer
U.S. Citizenship Required

TRW

Order your own subscription to COMPUTERWORLD



And get this Desk Top Solar Calculator **FREE** with your paid subscription!

Plus, you'll get a bonus with your subscription — the COMPUTERWORLD FOCUS issues. Each issue deals in depth with such topics as Software, UNIX™, Communications, and more.

Just complete the attached order form and mail it in this postage-paid envelope. Or call 1-800-544-3712* for faster service.

* In PA call collect 215 768-0388.
Unix is a trademark of AT&T Bell Laboratories.

COMPUTERWORLD
Users divided on System/38 bug complaint
Reaga direct
urity ck
Technology's expanding horizons
TOP OF THE NEWS
Users, vendors facing up to break-ins
Agencies' hacker troubles blamed on bulletin board
Product features reflect effort to enhance security

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO. 55 SOUTHEASTERN, PA 19398

POSTAGE WILL BE PAID BY

CIRCULATION DEPARTMENT
COMPUTERWORLD
P.O. Box 1016
Southeastern, PA 19398-9984

ROBERT HALF

EDP OPPORTUNITIES
COAST TO COAST

Robert Half, staffed by EDP professionals for EDP professionals with 80 offices throughout the U.S., Canada & Great Britain, is the largest network of personnel consultants in the Data Processing field. And its establishment in 1948 also makes Robert Half the oldest. One call and you can search the local, national and international markets ..... ALL FEES ARE PAID BY CLIENT COMPANIES, OF COURSE. The following is a partial listing of opportunities and locations.

HARTFORD

SYSTEM PROGRAMMER IMS

CT multi-div corp creating new position to provide DB support to all IMS sftwr planning/install. Full reloc. Excellent growth oppty.
Salary to **$45,000**

PROJECT MANAGER

If you have 6+ yrs DP exp w/current supvry bkgrd in DDA applications, our fin'l svcs client in CT wants to meet you! Full reloc.
Salary to **$40,000**

TELECOMM'S CONSULTANT

Design state-of-the-art integrated networks (voice/data) for prestigious fin'l org. Min 2 yrs in SNA design + min 3 yrs as a sftwr prog w/OS/MVS sys req. Bkgrd in proj mgmt a +. Suburban loc, excellent benefits + reloc paid. Salary to **$48,000**

PROG/ANALYSTS

Major fin'l org seeks qualified prog/analysts to work on a number of on-line devel projs in a CICS/IMS environ. Min 2+ yrs IBM exp & positions. Co provides excellent benefits & full reloc.
Salary to **$34,000**

DATA BASE (IMS, IDMS)

Data base pros seeking growth positions in data base design, data modeling, data architecture & DB sys programming. Investigate multi oppty's in HARTFORD area w/IBM/OS/MVS/XA install's.
Salary **$32-46,000**

MGR COMM'S SOFTWARE

CT industrial firm seeks indiv to direct corp staff providing IBM, SNA/VTAM to multi-loc. Mainframe sys mgmt bkgrd req'd. Full reloc.
Salary to **$50,000**

ROBERT HALF
of Hartford
111 Pearl Street
Hartford, CT 06103
(203) 278-7170

PROVIDENCE

SENIOR PROGRAMMER ANALYST

Leading SE MA mfr seeks astute P/A for new inventory control applications. IBM OS/MVS, COBOL and extensive user contact required. **$30,000**

ROBERT HALF
of Providence
900 Turks Head Building
Providence, RI 02903
(401) 274-8700

BOSTON

IDMS/COBOL P/A

BOSTON based internat F-500 firm seeks sharp IBM OS/MVS COBOL IDMS P/A for mfg sys apps. Strong MIS mgmt team can offer challenging mix of development & major enhancement projs. Leave your mark in this upwardly mobile dept. **$30,000**

CICS SYS PROG

Leading BOSTON fin'l svc firm seeks accomplished CICS tech support pro for hi-vis role in expanding net environ. Product install, CICS 1·6·1 & OS/MVS bkgrd pref. Unique advancement oppty offered. Salary to **$40,000**

VAX PROGRAMMER ANALYST

Escape from the hectic pace of the city to a rural setting. This SO MAINE svcs firm seeks talented P/A for VAX/VMS, DIBOL & COBOL apps devel. Previous PDP-11, RSTS prefer.
Salary to **$30,000**

ROBERT HALF
of Boston
100 Summer Street
Boston, MA 02110
(617) 423-1200

OMAHA

DATA PROCESSING DREAM JOB

Have you dreamed of a job that would give you everything – money, travel, state-of-the-art technical skills and lots of opportunity for advancement? Our client has multiple openings offering all of these ... and more! If you have a solid DP background and experience with the following: IMS, CICS, IDMS/ADSO, MARK IV, RPG III or COBOL call or send resume.

ROBERT HALF
of Omaha
7171 Mercy Road
Omaha, NE 68106
(402) 397-8107

AUSTIN

PROGRAMMER

Using DEC 1173. Extensive knowledge of DIBOL required. Some COBOL a plus. Financial applications background a plus. **$30,000**

ROBERT HALF
of Austin
400 East Anderson
Suite 334
Austin, TX 78752
(512) 835-0883

BUFFALO

SYSTEMS MANAGER

Dynamic corp HQ in Western PA actively seeking impressive Sr Analyst to support corp sys users. Req excellent COBOL & CICS. Prefer fin'l sys bkgrd. Opns exp a +. Outstanding visibility.
To **$40,000**

ROBERT HALF
of Buffalo
420 Main Street
1310 Liberty Building
Buffalo, NY 14202
(716) 842-0801

OKLAHOMA CITY

PROGRAMMER/ANALYST

Multi openings with major service corporation. Immediate need for IMS or IDMS applications programmers to work on development of new systems. 3-5 years solid IBM experience a must. Exciting opportunities with fast-pace leader.
Salary DOE to **$40,000**

ROBERT HALF
of Oklahoma City
1601 N.W. Expressway
Suite #777
Oklahoma City, OK 73118
(405) 843-0800

TENNESSEE

SYSTEMS ANALYST

Rapidly growing company requires someone proficient in COBOL, IBM OS/MBS, CICS and claims processing. Project management experience preferred.
Mid to Upper **$30's**

SR PROG/ANALYST

Large insurance company has an outstanding opportunity for candidate with Life Comm or Life 70 experience.
Mid **$30's**

ROBERT HALF
of Tennessee
1101 Kermit Dr., Ste 407
Nashville, TN 37217
(615) 361-4900

WASHINGTON

MANAGER

Financial firm in DC seeks Sr Analyst with ten years experience. DEC required. Fortran and COBOL essential. Manage five. **$45,000**

ROBERT HALF
of Washington
7316 Wisconsin Avenue
Suite 401
Washington, DC 20814
(301) 652-1960

ST. LOUIS

SHIFT SUPERVISOR OPERATIONS

Major Midwest service org running multiple CPU's (308X Series) under MVS/XA needs an Operations Supervisor with at least 2 yrs experience supervising a similar shop. Will manage 10+ operators and must know JES 2 and JCL. Position is on 1st or 2nd shift, so you must be open to either one. Salary to **$33,000**

RPGIII PROGRAMMER ANALYST

Stop doing 100% coding and expand your career! Dynamic manufacturer in St. Louis County is looking for a S/38 Prog/Analyst with at least 2 yrs experience programming in RPG III. This position offers visibility and a mix of programming and analysis. Salary to **$26,000**

PROGRAMMER ANALYSTS–COBOL

Service-based organization centrally located in the Midwest needs several COBOL Programmer Analysts to help design, develop and maintain business applications using CICS and IMS. Exceptional benefits and career path.
Salary to **$30,000**

ROBERT HALF
of St. Louis
7733 Forsyth Blvd.
St. Louis, MO 63105
(314) 727-1535

SEATTLE

COBOL P/A

Seeking highly motivated, professional individual with desire to work in state-of-the-art environment. Must have solid COBOL programming skills (1 yr absolute minimum) and IBM mainframe experience. Any exposure to IMS helpful, as is insurance or banking industry experience.
To Mid **$30's**

SENIOR DBA

Seeking individual with 4+ years physical and logical data base design experience in an IMS or CICS DL/I environment. This shop is heavily involved in relational data base installation — opportunity to work on leading edge technology.
To Mid **$40's**

Marjie Peterson
ROBERT HALF
of Washington State
600 University St., #2328
Seattle, WA 98101
(206) 624-9000

SAN ANTONIO

VP OF MARKETING

Must be very experienced in hardware/software marketing. Experience w/advertising, marketing strategies and market analysis on a large scale. Very helpful if technical background. Good benefits. To **$70,000**

PROGRAMMER

Must have 2 yrs RPGII, IBM 34/36. Using business appl helpful if experience w/production control or ACCT Appl. Excellent career path.
$30,000

SYSTEMS PROGRAMMERS

Openings for systems people w/exp in OS/MVS or DOS/VSE or VM/CMS. Helpful if data base or telecommunication exp. Large dept. Very stable company. To **$45,000**

ROBERT HALF
of San Antonio
6243 IH 10 West, Ste. 850
San Antonio, TX 78201
1-800-531-5402
in TX dial (512) 736-2467

SOUTHERN CALIFORNIA

PROGRAMMER ANALYSTS

Due to expansion our client seeks several P/A's with IMS, DB/DC, COBOL & IBM Mainframe exp. BS req'd & strong communication skills
Salaries to **$50,000**

ROBERT HALF
of L.A.
3600 Wilshire, #2000
Los Angeles, CA 90010
(213) 386-6805

WISCONSIN

PROGRAMMER

Your talents are needed now! A Milwaukee company that's on the move needs a person with PICK operating system knowledge. Honeywell and insurance backgrounds a plus.
$25–35,000

SYSTEMS ANALYST

Here's a unique opportunity to join a large multi-national company! Trucking industry applications experience needed for a large IBM shop. To **$60,000**

Frank LaPoint or Dick Bird
ROBERT HALF
of Wisconsin
777 E. Wisconsin Ave.
Milwaukee, WI 53202
(414)271-HALF(271-4253)

MINNEAPOLIS ST. PAUL

LEAD SOFTWARE ENGINEER

Technology development center for Fortune 500 firm seeks software professional to lead team in creation of new product. Requires 4 year degree and background in C, Assembler, Unix, IBM PC, Apple II. Also requires some experience interfacing with marketing staff. Recent project management and quality assurance expeience a plus. To **$55,000**

Mark David
ROBERT HALF
of Minnesota
3636 IDS Center
Minneapolis, MN 55402
(612) 339-9001

FREE
Ask for our
latest
Salary Survey.

ATLANTA

SYSTEMS PROGRAMMER

BS degree with at least 3 yrs macro assembler, COBOL & PL/1. SMP or SMP/E are plusses. **$43,000**

PROGRAMMER ANALYST

Requires S/38 bkgd with strong COBOL & RPG III.
$32,000

PROGRAMMER

Ideal candidate will have large Burroughs bkgd with at least 2 yrs online COBOL. DMS II and CANDE are plusses. **$26,000**

Terence H. White
ROBERT HALF
of Atlanta
3379 Peachtree Rd., N.E.
P.O. Box 10201
Atlanta, GA 30319
(404) 266-2153

KANSAS CITY

38 MANUFACTURING

Expanding $40 million division of international conglomerate seeks shirt-sleeve DP Manager. Prior System 38 experience in manufacturing required. Familiarity with MAPICS preferred.
To Low **$40's**

IMS PROJECT MGR

IMS heavy required to consolidate and revise 5 existing IMS data bases. Take project from planning stage thru implementation and documentation. To **$45,000**

George Waterman
ROBERT HALF
of Kansas City
127 W. 10th Street
Kansas City, MO 64105
(816) 474-4583

ALL
FEES
COMPANY
PAID

amdahl

Fresh Challenges

At Amdahl, we provide the business and scientific marketplace with some of the world's most sophisticated large scale computing and support systems available. The following positions call for experienced Systems Programmers with the foresight, energy and skill to assist us in continuing our tradition of innovation.

Systems Programmers

Will join our Operating Systems Team to support the development and validation of leading edge processors. Requires BS/MS in CS or Mathematics, or equivalent experience, and a minimum of 4 years' systems programming experience. In addition, qualified candidates will possess knowledge of MVS/SP, MVS/XA, JES 3, SMP/E and TSO/SPF. Knowledge of CICS/IMS, ACF/VTAM/NCP, TCAM and plug compatible hardware a plus. Other positions currently available require knowledge of VM/SP, VM/HPO, VM/XA SF.

Operating Systems Programmers

Will develop large system software projects to design, code and test future products related to mainframe computer systems. Requires BSCS/BSEE, or equivalent experience, a minimum of 3 years' systems programming experience on 370 architecture processors, and demonstrated ability in 370 Assembly language. Working knowledge of MVS or VM Internals preferred.

Exciting technology, a small team atmosphere and an environment where recognition and rewards are based on performance...that's Amdahl. To apply, please send your resume to: **Amdahl Corporation, Dept. 4-3/ME, P.O. Box 3470, M/S 300, Sunnyvale, CA 94088-3470.** Amdahl Corporation is proud to be an equal opportunity employer through affirmative action.

the amdahl phenomenon

Staff Director

COMPUTER SCIENCE AND TECHNOLOGY

The NATIONAL ACADEMY OF SCIENCES/NATIONAL RESEARCH COUNCIL seeks a staff director for its newly appointed Computer Science and Technology Board. The incumbent will help design, secure support for, and manage a major new program of studies. This position requires five years' experience in relevant research and policy studies or programs; familiarity with science policy, computer applications and policy issues; relevant administrative and project management experience; and demonstrated initiative and communications skills. An advanced degree in Computer Science or a related field is preferred. Please submit resume and names of three references to:

Pos. CPSMR/CSTB
Personnel Office, NRC
2101 Constitution Avenue, NW
Washington, DC 20418
An Equal Opportunity Employer.

PROGRAMMING

DO INTERVIEWS MAKE YOU NERVOUS?

Our brochure "The Corporate Interview" was formulated by recruiting professionals who have had broad experience in helping individuals to understand what is effective in the interview process. Whether you are looking for your first programming job or are pursuing an executive level position these guideposts are "required reading".

Send $2.00 for your copy of "The Corporate Interview."

The Woods Group
275 Madison Ave, NY, NY 10016
212-696-0790

ALLSUP'S
CONVENIENCE STORES

PROGRAMMERS AND PROGRAMMER ANALYSTS

Growing Convenience Store Chain located in the Sunbelt just hours from Major Ski and Water Recreation areas has a new data center using an IBM 4341 under DOS/VSE with COBOL, CICS, GENER/OL, and EASYTRIEVE.

We are undertaking a Major application development effort which offers challenging opportunities in the following areas:

PROGRAMMERS: 2 to 3 years IBM Mainframe COBOL experience and practical experience in on-line systems.

PROGRAMMER/ANALYSTS: 4+ years experience with COBOL in a DOS IBM Mainframe environment and at least 1 year of Command Level CICS experience. We offer generous benefits including: Life, health, and dental insurance; profit sharing; bonuses; and relocation.

If you would like to be a part of this exciting development effort please send your resume, including salary history and requirements, to:

Perry L. Jager
Manager of Systems and Programming
Allsup's Convenience Stores, Inc.
P.O. Box 1907
Clovis, NM 88101

An Equal Opportunity Employer

Let Dunhill Put You In Your Place

We've been putting professionals in their places for more than 21 years—places of opportunities.

Trying to find your place in MVS, CICS, IMS and Communications Systems Programming? How about IMS, CICS, IDMS, and ADABAS Programming Analysis? We also have requirements for DEC, VAX specialists, and other DP opportunities. Your background in banking, financial, manufacturing experience preferred.

Let Dunhill of Charlotte, the Professional Placement Service, put you in your place...a place of opportunity! Please call or write **Keith Reichle, CPC, Data Processing Specialist. DUNHILL OF CHARLOTTE, INC.,** 6401 Carmel Road, Suite 107, Charlotte, NC 28226. (800) 438-2012 or (NC Call) (704) 542-0312.

Dunhill®
The International Personnel System

Principal Research Scientist

Perform research and development on distributed database management system issues, define the requirements and design the extensions necessary to the Distributed Database Testbed System (DDTS) to support manufacturing automation. Analyze, design and develop the testbed architecture for the manufacturing automation systems technology program of the systems development division. Work with the Very Large Parallel Data Flow contract team to do research and define the software/hardware architecture of the Data/-Knowledge base subsystem.

Requires Ph.D. degree in CS or EE with emphasis on Computer Engineering. Requires 45 credit hours or 12 months experience in: distributed database management, and distributed transaction processing issues, advanced data models, high level data access languages, data distribution issues, computer communication networks, advanced computer architectures, distributed query processing and distributed update capabilities; design and implementation of information integration of automated factories, implementing distributed concurrency control and distributed data dictionaries. Requires knowledge of or experience with high level programming languages; C and Pascal, and Unix based workstations, VAX, Apollo and Sun. Salary $4,000 per month.

Submit resumes to: Mr. Dick Hewetson, Minnesota Job Service, #6-43, 309 Second Avenue South, Minneapolis, Minnesota 55401.

New England, Westchester & NY Metropolitan Area

PERMANENT &/OR INDEPENDENT CONSULTING

Programmer Analysts & Project Leaders
Design & Development

--BANKING--
DEC VAX VMS BASIC. 3-7 yrs exp.

--BROKERAGE--
Large scale systems. IDMS ADSO--CICS
Min 3-7 yrs exp.

--BANKING--
Exp CICS, any Database, ADABAS a plus.

Call 212-398-9891 or submit resumes to: VP Systems Development, Hank Walsh Assoc., 16 W. 40 St., NY, NY 10018.

DATA PROCESSING PROFESSIONALS

Keane, Inc. is one of the nation's largest and most experienced applications software companies. Due to strong economic conditions throughout the Northeast, Mid Atlantic and Midwest, Keane currently has over 100 permanent technical openings for career-minded DP professionals. Challenging assignments at Fortune 500 type companies are available out of Keane's 14 branch offices. To qualify, you must have at least two years of COBOL, plus one or more of the following:

IDMS	BAL
ADABAS	ADSO
CICS	ADS
UNIX "C"	NATURAL
IMS DB/DC	MARK IV

Relocation assistance provided. Our metropolitan and suburban locations offer a variety of lifestyles and technical environments. We offer competitive salaries and a comprehensive benefits package.

For more information, call Douglas Peck, National Recruiting Coordinator, collect at (617) 241-9200, or rush your resume to his attention at: Keane, Inc., Ten City Square, Boston, MA 02129.

An equal opportunity employer

KEANE
THE ESSENTIAL PROFESSIONALS

IN SAN FRANCISCO IT'S SPRING YEAR 'ROUND!
DATA PROCESSING PROFESSIONALS
skilled in Main Frames, Minis or Micros
– **DATA-BASE** or **ON-LINE SYSTEMS** –
Consider a move to the beautiful
SAN FRANCISCO BAY AREA.
Career opportunities offering
CHALLENGE, GROWTH and REWARDS.

LOGICAL OPTIONS
Incorporated Agency Est. 1975
One Market Plaza, Spear Tower, Suite #2014A
San Francisco, CA 94105 • (415) 777-3900

SOFTWARE PROFESSIONALS

Seeking individuals with strong technical credentials, including the following:
- BS/MS/PhD in Comp. Sci. or E.E.
- UNIX/C (incl. Shell or Kernal)
- Switching systems, op. systems, compiler development, networking, AI

We are a dynamic firm that can offer you an opportunity to work with the best in the field. Send resume to:

The ProTec Group Inc.
2941 Kenny Rd., Suite 260
Columbus, OH 43221
(614) 457-8055

UNIX is a trademark of Bell Labs

Don't trust us to keep your Classified information secret

Every week, we deliver more of your target audience than anyone else. Over 600,000 computer-involved professionals. Including MIS/DP directors, systems analysts, programmers, and engineers -- as well as corporate presidents, treasurers, and general managers.

And we deliver these readers for less. Compare costs and the people reached. You'll see that Computerworld is the number one medium for reaching MIS/DP professionals.

Our readers rely on Computerworld's classified section. In fact, 41% of our subscribers read the recruitment section every week. And 95% of our subscribers read this section regularly.

We make your ads work harder. Because we divide the classified section into logical categories: Position Announcements; Buy, Sell, Swap; Software For Sale; Time & Services; and The Bulletin Board. (Available on request: Software Wanted; Business Opportunities; and Real Estate).

So the people you want to reach will spend less time looking for your ad, and more time reading it.

We'll even typeset your ad at no extra charge. All you need to do is attach clean typewritten copy to your order. (Figure about 25 words per column inch, not including headlines). Or give us your order over the phone. We'll do the rest.

And since we're published weekly, we can offer you a fast turn-around from when you place your order to when your ad appears. As little as 10 days.

The next time you want results, advertise in Computerworld classified pages. Call toll-free at (800) 343-6474. In Massachusetts, call (617) 879-0700.

COMPUTERWORLD
Classified Advertising
Box 9171, 375 Cochituate Road
Framingham, MA 01701-9171

New England Careers

Offer Rich Rewards

$25,000–$100,000

Call Steve Jones toll-free at 1-800-821-7700, extension 800 B

A wealth of new positions are available right now in New England. Because of its high technology base, virtually every type of computer environment and computer position exists. With a strong economy, many new and some of the most prestigious firms throughout the area have retained Source Edp to help identify skilled computer professionals. They offer very generous salaries, benefit and relocation packages.

You'll also find that opportunities for recreational and cultural pursuits are just as plentiful. The area is rich in water sports, skiing, tennis, golf — museums, theatres, universities, historic villages and landmarks.

To find out more about any position listed below — or others you might like to hear about — call Steve Jones toll-free day or night at 1-800-821-7700, extension 800 B. There's no cost or obligation to you and your inquiry will be held in strict confidence.

If unable to call, write: Steve Jones, Department C-4, Source Edp, P.O. Box 7100, Mountain View, CA 94039.

Connecticut

Director — Systems Development *(861-01)* Manage a group of engineering and business system development managers in a large manufacturing environment. High visibility in a fast-track company. Stratford. To **$70,000 plus bonus.**

Data Center Manager *(861-02)* Multi-billion dollar company with multiple mainframes and a big network environment seeks a computer operations leader to manage a staff of thirty and help plan future growth. Norwalk location. To **$65,000.**

Project Leader *(861-03)* You will lead the design and development team in new on-line data base systems development for purchasing, inventory replenishment and reporting systems. Norwalk location. To **$48,000.**

Programmer/Analysts *(861-04)* Participate in three years of new development for on-line data manufacturing, inventory control and financial applications. Opportunity to learn CICS in a large-scale MVS environment. Connecticut-based. To **$34,000.**

Programmer/Analysts — Project Leader Potential *(861-05)* You will participate in heavy analysis and development and take control of major project modules. Background should include four or more years IBM COBOL and some analysis. Connecticut location. To **$36,000.**

Data Base Analysts *(861-06)* Get involved in significant growth. Participate in the evaluation of new dbms by evaluating and selecting DB2, ADABASE, IDMS and IMS. Fortune 500 company located in Southern Connecticut. To **$50,000.**

Technical Services Manager *(861-07)* Lead group of MVS Systems Programmers in generation, tuning and support of multiple 308X's with 3090's on order. Support IMS DB & DC, 'PC' gateways, and big network environment. Stratford location. To **$70,000.**

Software Engineers *(861-08)* You will develop voice recognition products. Norwalk-based company has future plans for major AI R & D effort. A degree in CS or EE plus two or more years experience in C, PASCAL or micro assemblers preferred. To **$42,000.**

Software Systems Development Manager *(861-09)* Norwalk-based company seeks individual to lead group responsible for operating systems and applications development of real-time closed loop applications in VAX/VMS/UNIX shop. To **$55,000.**

DP Manager/System 38 *(861-10)* Become key staff member in the implementation of manufacturing and other business applications for this $75 million Norwalk-based division of an international corporation. To **$45,000.**

Communications Network Manager *(861-11)* Lead network operations group in three locations. Evaluate new hardware and software network tools for this major financial services company. Trumbull location. To **$52,000 plus bonus.**

Software Engineer *(881-01)* Major hi-tech vendor seeks Software Engineer with two or more years data communications software development or support experience with protocols including 2780-3780, X.25, Ethernet and other LAN software. Be part of a software development team for mini/micro-based LAN systems. Connecticut location. To **$42,000.**

MVS Systems Programmer *(881-02)* Major Hartford-based Fortune 500 firm with suburban data center seeks experienced MVS Systems Programmers with at least two years of MVS sysgen, SMP and problem resolution. This is a rapidly expanding MVS/XA multiple-CPU environment. To **$45,000.**

Senior Programmer/Analyst *(881-04)* Ground floor opportunity in a new Check processing area. Large rapidly expanding financial institution in Hartford seeks an experienced MICR Programmer to head-up a new check processing area. Opportunity to become a Manager makes this position perfect for a bright, aggressive professional. To **$38,000.**

COBOL Programmers — Train In IMS DB/DC *(881-05)* One of the largest employers of data processing professionals in New England has multiple openings for OS/COBOL Programmers with one year experience. This firm offers extensive in-house training in IMS DB/DC and CICS programming skills. Hartford location. To **$25,000.**

Senior Programmer/Analysts — IMS DB/DC Applications Development *(881-06)* Learn IDMS. Fortune 50 conglomerate seeks talented, degreed professionals with strong OS/COBOL and IMS DB/DC experience to develop and maintain manufacturing, financial, and personnel systems for a Hartford-based division. Knowledge of MFS a plus. Opportunity to cross-train in IDMS. To **$38,000.**

Data Communications Manager *(881-07)* Major Hartford bank seeks experienced TC Analyst to plan and supervise migration to SNA/SDLC. Be part of key management on all telecommunications issues. To **$45,000.**

Systems Designer — Group Insurance *(881-09)* Major Hartford-based insurer is seeking a technical-oriented professional to head the acceptance testing and implementation phases of a multiple-stage defined contribution system. Problem-solving and organizational skills are a must. To **$35,000.**

Lead Systems Designer — Investment Products *(881-10)* Hartford-based financial organization seeks individual with four or more years systems analysis background to lead the development of a consolidated statement project. CICS or DL/1 data base experience is a plus. To **$39,000.**

Systems Team Leader *(881-11)* Major financial organization with a campus-like setting is seeking a Senior Systems Analyst ready to be promoted to a first line management position. The individual will be responsible for three Programmer/Analysts providing enhancement and production support for a group of on-line CICS and batch COBOL applications. Connecticut location. To **$41,000.**

Supervisor — Applications Programmers *(881-12)* Insurance leader seeks professionals with previous supervisory experience to supervise team of Programmer/Analysts on an IBM mainframe, on-line, IDMS development project. High visibility and exceptional advancement potential. Hartford location. To **$36,000.**

Massachusetts

Senior Sales Representative *(901-01)* Sell 4th generation language software and DBMS software to major IBM users in Southern New England. This well-known software vendor seeks an experienced Sales Representative with at least three years of successful software sales to the IBM mainframe marketplace. To **$100,000.**

Systems Manager *(901-02)* Manage multiple VAX/VMS computer systems in an environment implementing PC's, DBMS and Ethernet. You will have contact with users and will work with various software/hardware tools. A degree and minimum of three years in-depth VAX/VMS experience sought. Marlboro location. To **$42,000.**

Telecommunications Analyst *(901-03)* You will set-up a complete telecommunications network for a new data center. This will involve selecting and implementing the most up-to-date data and voice systems. Three to six years voice and data communications equipment support and installation desired. Boston location. To **$35,000.**

Artificial Intelligence Software Engineer *(901-04)* A major systems vendor developing artificial intelligence and natural language capabilities onto their next generation of computers seeks a Senior Software Engineer with eight or more years experience in lead development. Natick location. To **$55,000.**

Senior RPG Programmer/Analyst *(901-05)* Major North Dighton distributor seeks a Senior RPG Programmer/Analyst to develop major new systems for their multiple System/38 and 4381 environment. Excellent opportunity to move into a large system environment. Management potential. Three or more years RPG III desired. To **$37,000.**

EDP Auditor *(901-06)* Major Framingham manufacturer with a newly implemented international distributed computer network seeks EDP Auditor to create and implement controls. European travel. Two or more years EDP Audit in an IBM OS/MVS environment desired. To **$44,000.**

Information Systems Director *(901-07)* Reading company is seeking an individual to lead our expanding data center. You will continue the expansion of distributed processing, the use of IDMS and 4th generation languages, and an information center. Ten years of experience including data center management, COBOL programming, IDMS knowledge, and a BS/BA degree is desired. To **$75,000.**

FORTRAN Software Engineer *(901-08)* Work with a variety of high-level languages including FORTRAN, PASCAL and C developing graphic interface software. These software products will connect mini and micro processing capabilities into one very large real-time processing system. Two to eight years of R/T software experience and a technical degree preferred. Wayland location. To **$43,000.**

Technical Support Consultant *(901-09)* A successful, medium-sized communications products company in Billerica seeks a Technical Support Consultant to diagnose and coordinate the technical solution to problems arising with LAN and other network products. This is a ground floor position. Three or more years experience developing or supporting communication hardware or software and a BS or BA degree is desired. To **$41,000.**

Project Leader *(901-10)* A leading financial services company is undergoing a major new development project. You will lead a fifteen person team in developing a completely new IDMS/R-based on-line system. An aggressive self-starter with a track record of successful systems development in an IBM/DBMS environment is desired. Boston. To **$44,000.**

IMS DBA *(901-14)* A fast growing IMS shop in the Boston area seeks one Intermediate and one Senior IMS DBA to participate in new systems development. You'll receive excellent benefits which includes an on-site health club. To **$45,000.**

Communication Product Manager *(901-12)* Develop both product and marketing strategy for communication products to be utilized primarily in a PC to mainframe environment. Knowledge of PC's, IBM mainframes and communication software desired. BS/BA and advanced degree preferred. Billerica location. To **$48,000.**

IBM Systems Programmers (6) — New Data Center *(901-13)* New subsidiary of major corporation in Boston is building a new data center, and is staffing a technical support group from scratch. Ground floor opportunities are available to Systems Programmers experienced in MVS, CICS, VTAM/NCP, or VSAM/DASD. To **$48,000.**

Information Center Specialist *(901-11)* Prestigious Investment Company in Boston seeks an experienced INFO Center Specialist to lead a three-person team. This is a high visibility position offering daily contact with senior executives. Strong knowledge of information center tools in an IBM environment, and the ability to work in a fast paced environment is desired. Securities industry knowledge a plus. To **$42,000.**

Programmer/Analysts IDS-II *(901-16)* Fast growing Boston suburban company which develops large-scale data base systems for the U.S. Government has several openings for individuals with three or more years experience on Honeywell/COBOL systems with IDS-II. Rapid promotion potential to Project Leader. Full relocation package. To **$48,000.**

Life Insurance System *(881-08)* Extensive career growth available on major new development project at prestigious insurer. Be a part of a total rewrite of all individual administration systems. Suburban Massachusetts location. To **$42,000.**

New Hampshire/Vermont

Senior Technical Writer *(901-15)* Leading Northern New England computer vendor, currently developing advanced UNIX-based supermini computers is seeking an individual to lead its technical documentation group. Three or more years experience in UNIX internals preferred. Excellent growth potential. To **$38,000.**

RPG III Programmer/Analyst — Ski Country *(901-17)* An unusual opportunity to live in the heart of Vermont Ski Country and work premier resort. Top technical environment and professional challenge with excellent benefits, free skiing, and full relocation. Prefer two to five years System/38, RPG III experience with business applications. To **$35,000.**

Software Engineer — Networking *(901-18)* New Corporate R&D center for major vendor. Join the development team of the most advanced networking and communications products. Five or more years software engineering and experience with IBM protocols, LAN's, or DECNET are desired. Excellent benefits and relocation. To **$54,000.**

Systems Architect *(901-19)* Become the primary Systems Architect for the design and development of a new, fully transportable 4th generation language implemented on superminis and IBM PC's. You will be involved with design user interface and the coordination of a broad base of engineering resources. Full relocation. To **$78,000.**

source edp®
Personnel Services

The world's largest recruiting firm devoted exclusively to the computer profession.

Client companies assume our charges.

Call today: 1-800-821-7700, ext. 800 B

DATA PROCESSING

Systems Engineers – Join the Alliance Generation

Los Angeles

National Advanced Systems' Alliance Generation of IBM-compatible mainframe computers and peripherals have earned us a reputation in the marketplace as the leader in advanced technology systems, with unequaled reliability. Our success is a reflection of many alliances—from our partnerships in systems integration with world-class developers of hardware and software, to the teamwork and individual creativity we foster in our professional marketing and technical support staff.

If you presently live in the metropolitan area of Los Angeles, and want to greatly enhance your career without relocating from family, friends and business associates, you may want to explore the opportunities for Systems Engineers that have been created by our strong, sustained growth.

As a Systems Engineer you'll provide technical support for marketing activities, working closely with prospects and customers. Duties include performing technical studies, planning hardware/software configurations and giving formal product presentations.

To qualify, you should have at least 8 years experience in the data processing industry, including 5 years systems programming experience in an IBM 4300, 308x, 3090 or large-scale IBM compatible systems environment. A bachelor's degree in a related field, ability to perform CPU and DASD capacity studies and detailed knowledge of MVS/XA and VM operating systems are highly desirable.

Interested in the Alliance Generation? If so,send your resume to: National Advanced Systems, SE Position, 1 Golden Shore, Long Beach, CA 90802. We are an equal opportunity employer. Principals only please.

National Advanced Systems

MVS SYSTEMS PROGRAMMER

The Applied Physics Laboratory (APL), a high-technology R & D organization located midway between Baltimore and Washington, has an immediate need for a Lead Systems Programmer. This individual would provide a lead role in evaluating, installing, testing, and enhancing MVS system software. In addition, the successful candidate should possess good communications skills and be capable of supervising other systems programmers. Minimum requirements include a BS degree in a technical discipline or its equivalent in education and experience, plus two years of experience with MVS operating system software or related MVS system software.

APL provides a comprehensive benefits package as well as competitive salaries. Qualified persons should send a resume to:

Ned Aull
Department LER-472C
The Johns Hopkins University
APPLIED PHYSICS LABORATORY
Johns Hopkins Road
Laurel, Maryland 20707
EOE M/F

MAJOR EXPANSIONS —Southeast—

Unprecedented growth of **prestigious Carolina company** has created numerous opportunities in their State-of-the-Art data center IBM 3090 and 3084 MVS/XA IMS NCP/VTAM. CICS Currently seeking Programmer Analysts Systems Analysts. DBA's and Systems Programmers **Banking or Insurance exp. guarantees immediate consideration**. Opportunity for rapid advancement into Sr level & Project Mgmt **Salaries to $40K + CASH BONUS** For more info. call Camille Hankins collect at (704) 375-0600 or send resume to

212 S. Tryon Street, Suite 1350
Charlotte, NC 28281

Billion $ corporation seeks several Programmer Analysts & Systems Programmers with 2-5 yrs exp for this **ground-floor** opportunity

IDMS/IMS Prog. Anal. [Mfg./Finance]	**$Open**
NCP/VTAM Sys. Prog. [New Start-Up] . . .	**To $36K**
CICS Prog. Anal. [Coding/Anal.]	**To $38K**
MVS/XA Sys Prog. [Gens/Maint.]	**To $45K**

Top Perks! Including stock options. savings plans. and relocation bonuses. If you are serious about a career move. call Robert Montgomery collect at (919) 872-2940. Over 6yrs experience specializing in data processing

P.O. Box 40129
Raleigh, NC 27629

fox-morris

VAX/VMS SYSTEM SUPPORT ACADEMIC COMPUTING CENTER

Clarkson University, in upstate New York, is seeking an individual with at least three years experience as a systems programmer in the VAX/VMS environment. The applicant should possess good communications skills and the ability to work with faculty and students. Required experience includes systems generation, enhancements, and problem determination, along with developing programs using both assembly-language and high-level programming.

The Schuler Resources Center furnishes the University with central computing facilities for instructional, research, and administrative functions. Presently installed is a VAX 11/780 and a VAX 11/785 running VMS, an IBM 4341-2 running VM/CMS, and a Gould PN9080 running UNIX. All of the host computers on campus are being interconnected with a comprehensive data network, which will in turn be linked to state and national computer networks. The Resources Center network will provide campus-wide access to these facilities via personal computers.

Our systems group consists of four professionals and a staff of students who operate in an open environment, where each individual is encouraged to promote and develop ideas into actively supported projects. We offer an excellent benefits package and our employees have the opportunity to enter Bachelors, Masters, and Doctoral degree programs. Send resume, salary requirement, and three references, in confidence, by May 23, 1986, to **Michael A. Short, Manager, Systems Support, Educational Resources Center, Clarkson University, Potsdam, New York 13676.**

An Equal Employment/
Affirmative Action Employer.

DATA PROCESSING OPPORTUNITIES

1-800-423-5383

Our clients in the **SUNBELT** and throughout the U.S. have **HUNDREDS** of current needs.

LIFE/70 or LIFECOMM	To $60K
SYSTEMS PROGRAMMERS	$ OPEN
DATA COMMUNICATIONS	To $64K
IDMS, IMS or ADABAS DBA's	To $50K
P/A (IBM COBOL or ALC)	To $40K
CONSULTING	$ OPEN

SAUDI ARABIA

MVS, CICS INTERNALS	To $63K
P/A, COBOL, CICS, DL/1, MVS	To $54K

Call or send your resume to:

ROBERT SHIELDS & ASSOCIATES
P.O. Box 580056, Dept. C
Houston, Texas 77258-0056
In Texas Call: 713/488-7961

DP PROFESSIONALS

Opportunity is out there for the taking!

THINK ABOUT IT!

Dynamic, state-of-the-art companies, many of them FORTUNE 500, are expanding their staffs.

Locations: NC, SC, VA, KS, OH, DC.

CALL ASAP, if you have the following skills:

SYSTEMS PROGRAMMERS
(MVS, CICS, VTAM, or IMS)
PROGRAMMER ANALYSTS
(IMS/DBDC, DL1, or DB-2)
PROGRAMMERS & ANALYSTS
(Sales/Marketing Applications)
PROGRAMMERS & ANALYSTS
(VAX w/COBOL or FORTRAN)
DATABASE ANALYSTS
(IMS/DBDC, DB-2 or IDMS)

CALL or WRITE
BRENDA CAREY CPC

(919) 584-5591

PERSONNEL PLACEMENT, INC.
P.O. BOX 1815
BURLINGTON, N.C. 27216-1815

ONLINE & DATABASE ATLANTA & SOUTHEAST

$25,000 to $60,000

Need Programmers, Programmer/Analysts and Contract Programmers for IBM Shops. Relocation Expenses Paid.

Send resume to:

Jim Heard
EDP Consultants, Inc.
3067 Bunker Hill Road,
Suite 202
Marietta, Georgia 30062
404-971-7281

BUSINESS ANALYST

Temporary one year position as Systems Officer for Citibank to train computer users in banking applications of new range of computer programs in New York, Miami, Houston and South America. In addition to on-site training, applicant will be responsible for preparing user manuals and educational material in both English and Spanish. Applicant must be fluent in both English and Spanish. Must possess knowledge of IBM computer systems; COBOL, DL/1, CICS. Three years experience as Business Analyst or Computer Programmer. Dates of employment: May 15, 1986 to May 1S, 1987. Salary: $S9S.00 per week. Send resumes to:

P. Volz
Citibank N.A.
Sort 2230
New York, NY 10043

DP CONSULTANTS

Project Managers Senior P/As

Contracting or permanent positions in the following areas:

- ● ACP/PARS
- ● HONEY DPS/GCOS
- ● CICS
- ● IMS DB/DC
- ● IDMS ADS/O
- ● NATURAL/ADABASE
- ● HP3000
- ● X.25
- ● VAX/VMS
- ● UNIX/C
- ● NOMAD
- ● MVS SYSTEMS
- ● GCOS SYSTEMS
- ● IBM SR1/RPS
- ● INTEL Z/80
- ● LIFECOMM
- ● FOCUS
- ● WANG VS
- ● VM SYSTEMS
- ● DATACOMM
- ● AN/YUK
- ● CMS-2
- ● JOVIAL
- ● HOGAN

COMPDATA
The Talent Market

936 Silis Deane Hwy.
Weathersfield, CT 06109
203-563-8372

1767 Morris Ave.
Union, NJ 07083
201-964-5486

19S Worcester Rd.
Wellesley, MA 02181
617-235-3633

1016 W. Ninth Ave.
King of Prussia, PA 19406
215-265-8977

172S Jeff Davis Hwy. #406
Arlington, VA 22202
703-892-0212

Computer Systems Analyst - Develop & implement DMS-II database system & on-line GEMCOS application systems on Burroughs large mainframe computer. Analyze, design, develop, & implement Burroughs Manuf. System (TMS). Maintain & upgrade currently existing systems, specializing in production & inventory control. Implement & maintain Burroughs Purchasing Information Mgmt. System.

SPECIAL REQ'TS:
A. Min. 1½ yrs. exp. on Burroughs PCS-III software package (Burroughs Manuf. System).
B. Min. 2 yrs. exp. in database & on-line system on Burroughs large computer.
C. Min. 6 mos. exp. in COBOL programming for inventory, production & manufacturing control.

Min. Exp: B.S. in Electrical/Electronic Eng. or Comp. Sci. 4 yrs. in job offered or 4 yrs. in related occupation as Programmer/Analyst. 40 hrs. 8:00 AM - 4:30 PM. $33,000 per yr.

Resumes to: NYS Job Svc., JO #0701466, DOT 012.167.066, SS Church St., White Plains, NY 10601.

INFORMATION SERVICES BUREAU EXECUTIVE DIRECTOR

San Diego City Schools
$60,948 - $77,820 Annually
(1986-87 Salary Schedule)
Excellent Benefit Package

San Diego City Schools has a management vacancy to plan, organize, direct and manage operations of the Information Services Bureau for the person with a Bachelor's degree in Business or Public Administration or related field with emphasis in information systems. Must have 10 years progressively responsible business information experience with 5 years in information systems management preferably in an educational environment.

Contact: San Diego City Schools, Attention: Frank McAninch, 4100 Normal St., San Diego, CA 92103, (619) 293-8S3S.

An Equal Opportunity Employer

LEARN CICS

-- $25,000 --

Have you had some CICS training, but can't find the chance to use it? This local conglomerate will give you on the job CICS! What's required? The ideal candidate MUST HAVE: 1+ YEARS OF COBOL & formal educational exposure to CICS. This is a rare oppty. so circle this ad in red!!

ROBERT HALF
OF NEW YORK, Inc.
522 Fifth Avenue
New York, NY 10036
212-221-6500

MAINE - N.H.

We have specialized in data processing professional placement in Maine & N.H. for a fifth of a century. If you qualify for positions in the $25-50,000 range, please contact us in total confidence. Our clients pay our fees and provide relocation assistance.

ROMAC®

183 Middle St., 2nd Floor
P.O. Box 7040 DTS
Portland, Maine 04112
(207) 773-4749

OVER 600,000 CHANCES TO WIN!

Hiring a new employee is always a bit of a gamble, but when you advertise your job openings in Computerworld's classified pages, the odds are on your side.

In every major market, Computerworld reaches more data-processing professionals than the local recruitment media. And we reach them for less. Consider the facts:

1. More than 600,000 computer-involved professionals receive Computerworld every week. That's more than any other trade journal, business publication, or general magazine.
2. Our readers are the very people you're looking for. MIS/DP directors, systems analysts, programmers, and engineers -- as well as presidents, treasurers, and general managers.
3. Computerworld delivers quality readership. Fully 41% of our subscribers read Computerworld's recruitment section weekly. And 95% of our subscribers read this section regularly.

When you compare costs and the people reached, Computerworld is the number one medium for computer-related recruitment advertising. Place your ads today. You'll get the responses you're looking for. And you'll get them fast, because we accept ad materials up to 10 days before the issue date.

Simply call toll-free (800) 343-6474. In Massachusetts call (617) 879-0700. Call now.

COMPUTERWORLD
Classified Advertising
P.O. Box 9171
375 Cochituate Road
Framingham, MA 01710-9171

Data Processing Opportunities

Your energy and expertise will make an impact at Florida Power! We're relied on by over 3 million residents of Northern and Central Florida for safe, efficient energy. To ensure meeting the demands of our expanding customer base, we're seeking talented individuals to contribute to the systems behind our energy network.

Data Security Analyst

This position calls for a Bachelor's degree and four years data processing experience including system design, COBOL, and JCL. Knowledge of ACF2, SAS, and IDMS coupled with strong communication skills is desirable. Your expertise will be needed to technically and operationally support the data security and disaster recovery functions and to perform analysis, design, and programming activities. This position also requires interfacing with CSD and user personnel to resolve security related problems.

Application Programmer Analysts

You should have a Bachelor's degree, 2-6 years of relevant system design and programming experience, and a knowledge of ANS COBOL, IBM OS/VS JCL, TSO/ISPF, CICS, VSAM and structured programming techniques. Working knowledge of IDMS Data Base, SAS, FOCUS, DYL 280 is highly desirable. You'll work on the analysis, design, development, and support of operations information systems and programs. Strong oral and written communications skills a must.

At Florida Power, you will use your talents and ideas fully while enjoying the incomparable lifestyle the sunshine state offers. Housing is affordable and plentiful, and your compensation will go further with just 5% sales tax and no state income tax! And with the variety of recreational and cultural resources, you have the ideal environment to compliment your career.

If you're ready to put your ideas to work, send resume, including salary history, in confidence to: **D.L. Givens, DPO5/86, Recruitment D2Z, FLORIDA POWER CORPORATION, 3201 34th Street South, St. Petersburg, Florida 33711.** U.S. Citizenship Required–No Agencies. E.O.E. M/F/H.

WHERE YOUR ENERGY MAKES THE DIFFERENCE

Florida Power
CORPORATION

EDP SECURITY ADMINISTRATION

WE KNOW WHERE WE'RE GOING JOIN US!

Empire Blue Cross Blue Shield challenges career-minded individuals to assume important positions in our expanding Security Administration Department. Our State-of-the-Art IBM Data Processing installation attests to our commitment: 3081 and 3090 mainframes supporting OS-MVS/XA, CICS, TSO/SPF, TOTAL, IMS (DB/DC), SNA and more—with COBOL the principal language.

These senior Technical and Analyst positions require hands-on experience in the following areas: Systems Development Life Cycle, CICS, Security Software such as RACF/ACF2/GUARDIAN/Top Secret, Teleprocessing Protocols, IMS DB/DC, Physical security devices, etc. Candidates for the senior positions should have 5–10 years of demonstrated progressive work experience. Candidates for lower-level positions will be considered based upon solid technical experience. Good verbal and written communication skills are essential.

Our salaries are competitive and our comprehensive employee benefits package includes an excellent tuition refund program and advanced technical education center. If you're looking for a real career oppotunity in a leading-edge company, then send your resume in confidence to: **Director of Data Processing Recruitment, Dept. 631, Empire Blue Cross Blue Shield, 622 Third Ave, New York, NY 10017**

An Equal Opportunity Employer M/F/H/V

Start in front . . . stay in front

Empire
Blue Cross
Blue Shield

DIRECTOR

Information Support Services
County of Burnet

Live in the County of Burnet, in the heart of Texas, genuine cowboy and bluebonnet country, at the center of the beautiful Highland Lakes of Texas and the scenic Texas Hill Country, one hour west of the Austin high-tech corridor.

The Commissioner's Court of the County of Burnet invites applications for a permanent and challenging professional position, **Director, Information Support Services**. The Director will singly administer, manage, and support a new, dynamic, state-of-the-art computer facility and information center which will service traditional government data processing and information processing functions for enthusiastic, countywide, first-time Users.

QUALIFICATIONS: This position requires a wide range of verifiable professional capabilities and technical expertise (i.e., junior/senior technician, project manager, seasoned data processing manager) represented adequately by at least 6-10 years of intensive industrial experience. Degree or equivalent experience. Local, municipal, county, or international government agency experience desirable but not required. Bilingual (English/Spanish) fluency is an asset but not a requirement.

DUTIES: The Director reports directly to Commissioner's Court and has budget responsibilities for the computer facility and information center. The Director will solely assume leadership and responsibility for the total information support services operations including direct, "hands on" accomplishment of systems technical support, traditional production room functions, hardware and software troubleshooting, and local and remote user interface, education, and continuing education. The Director should have a conceptual ability and capacity to readily adapt to our specific technical and application environment. The Director will be instrumental in the development of new procedures, policies, routines, and work functions resulting from creative application automation in a growth progressive and quality-oriented county government. Local and regional travel. On 24-hour call.

POSITION INFORMATION: Salary range is $28,000 - $34,500 (depending on experience), plus attractive benefits. Position closing date is 6/2/86 at 5 PM. Manning at earliest availability.

TO APPLY: Send letter of application (indicating earliest availability), resume, and 5 professional and technical references (name, address, and telephone number) to: Human Resources Office (Special), County of Burnet, 220 S Pierce St., Burnet, TX 78611 Applicants are encouraged to optionally provide (1) an appendix which may disclose and illustrate a broad range of technical experiences and expertise, and (2) a technical sheet which discloses the applicant's capacity to perform systems technical support for specific computer systems.

The County of Burnet is an EOE/AA M/F/H/V
Please, no agencies.

Data Processing

ATLANTA
. . . City of Opportunity

Major corporations rely on CAP GEMINI AMERICA As a leading Data Processing Consulting firm, we have earned a unique reputation for reliable and dependable service We currently seek Programmer Analysts with at least 2 years experience to keep pace with on-going advancement in our field Our immediate need is for those with experience in

DB II	FOCUS
IMS DB/DC	ENVIRON I
TOTAL	PL 1

ADABAS NATURAL

If you share our dedication to progress, you will find CAP GEMINI AMERICA a rewarding experience For immediate confidential consideration, contact

Anne Perreyclear

CAP GEMINI AMERICA

**1800 Century Blvd., NE
Suite 910
Atlanta, GA 30345
(404) 633-2600**
Equal Opportunity Employer

FLORIDA

P/A-SYS 38-RPG III	TO 27K
P/A-SYS 34-MAPICS	TO 25K
SYS PROG-MVS-CICS	TO 38K
P/A-DOS/VSE & SYS 34	TO 26K
P/A-MVS-COBOL-CICS	TO 27K
P/A-SYS 36-2 Yrs Exp	TO 30K
ANAL-MVS-ORDER ENTRY	TO 29K
P/A-MVS-IDMS-ADSO	TO 32K
P/A-IMS DB/DC-MVS	TO 29K
P/A-HOGAN	TO 27K
SR P/A-HW-L66	TO 34K
MGR-VAX	TO 40K
ANAL-NCP NETWORKING	TO 35K
P/A-BURR-COBOL	TO 25K
DBA-IMS DB/DC	TO 39K
SYS PROG-CICS	TO 32K
P/A-ADABAS	TO 32K
P/A-IDEAL-ADR	TO 28K
EDP AUDITOR	TO 28K

STAN ALLEN

**ROBERT HALF
OF TAMPA, INC.
1311 N. Westshore Blvd.
Tampa, FL 33607
(813) 876-4191**

Technical Professionals
Let Our Network Connect You To A Brighter Future.

Software Research Corporation (SRC) is the software expert that many sophisticated computer hardware and software suppliers in the world turn to for help in specifying, developing, testing and maintaining computer software that operates in IBM networks. The work done in our 3 organizations – Consulting, Development Laboratory and Software Products – has gained us respect industry-wide as *"The Network Software Company"*. Our rapid growth has provided these career opportunities:

ARCHITECT/SYSTEM DESIGNER for a family of heterogeneous distributed office automation products. Resp. for documenting, managing and extending product architecture. Reqs. MSCS, 2+ yrs. as distributed systems SW architect/designer, 7+ yrs. systems SW product development and significant exper. with 2+ of the following – VS, VAX/VMS, PC/DOS, 370/VM.

NETWORK ARCHITECT to lead team in conceptual design/prototype of new products. Will also work to improve methodology/process of SW development and be guru on SW technology & standards such as CCITT x400 & ISO OSI. Reqs. 8+ yrs. exper. as an architect for a major network or mainframe vendor. Plus exper. with various mainframes, PC's and mini's. Familiarity with SNA, DECNET, File Transfer, Message Handling & Directory Services.

SYSTEMS PROG (CICS/DISOSS): reqs. 2-5 yrs. with CICS, plus exper with assembler prog., DISOSS, PC/Host Connects, SMP/E or SMP-4, Networks and VTAM.

SW PROJ LEADER to lead design/implementation of heterogeneous distributed office automation product development projects. Reqs. MSCS, 2+ yrs. SW proj. leadership, and 2+ yrs. relevant systems SW development exper.

TECHNICAL INSTRUCTOR/DEVELOPER to develop/present data communications courses to technical audiences nationwide. You will work with engineering, and research technical publications to define course content; then develop courses independently. Reqs. exper. with data communications and a proven track record with competency-based learning/instructional design. Ideal cand. will have worked with a variety of delivery methods and have hands-on programming exper.

TECHNICAL WRITERS to write/edit user documentation for communications SW. Reqs. solid exper writing for a technical audience.

TECH SUPPORT ANALYST to provide on-site/telephone support to our customers. Resps. include installation and ongoing support in the areas of problem isolation and analysis. Reqs. 4+ yrs. technical exper. in an IBM environment. IBM assembler. Exper. with MVS critical. VM, VAX, VS, CICS, DISOSS desirable.

SALES REPS to represent SRC in Boston, Hartford, NY, Chicago, Atlanta, Dallas, and LA. Reqs. min. 5 yrs. in computer SW sales. Successful cand. will have sold 50K+ systems directly to MIS VP's in Fortune 500 co.'s.

PRODUCT MGRS to bring to the marketplace strategic SW products and consulting/time sharing services Act as the single interface between marketing and engineering through product life cycle. Resps. include planning and monitoring development, marketing and promotional activities. 5+ yrs. solid prod. mktg. exper. including some work with IBM HW and SW critical.

SRC offers highly competitive salaries and benefits, plus an opportunity for personal recognition in our small team environment. We're located in one of the world's most active high-tech centers, minutes from the cultural, recreational, and educational resources of Boston. To apply for one of these exceptional opportunities, please send resume to Ruth Slabine, Software Research Corporation, 1 Natick Executive Park, Natick, MA 01760.

An equal opportunity employer

SRC
SOFTWARE
RESEARCH
CORPORATION

SENIOR SYSTEMS ANALYSTS
PROGRAMMER ANALYSTS

The Agricultural Chemicals Group of W.R. Grace & Co., a major US multinational company, has immediate job opportunities for Senior Systems Analysts and Programmer Analysts in its Headquarters Office in Memphis, Tennessee.

All candidates should have a bachelors degree in computer science or business data processing.

- Senior Systems Analyst candidates should have a minimum of 5 years experience in systems design, preferably in inventory systems.
- Programmer Analyst candidates should have 2-5 years experience in systems analysis and programming on DEC 20 computers, using Accent R.

This Fortune 50 Company offers a comprehensive benefit program and excellent salary opportunities. For prompt, confidential consideration, please forward your resume and salary history to: P.L. Breeckner, W.R. Grace & Co., P.O. Box 277, Memphis, TN 38101.

GRACE
Agricultural Products
An Equal Opportunity Employer M/F/H/V

a better place to work

American General is an insurance-based diversified financial company whose growth continues to create opportunities for dedicated professionals.

American General Services Company, a newly formed subsidiary of American General Corporation, provides data processing support for the growing needs of all the Houston-based Companies.

We have recently added an IBM 3090 to the 3084/XA environment in response to the growth of our organization due to the ongoing American General Life Insurance Company consolidation effort.

PROGRAMMER ANALYSTS SYSTEMS ANALYSTS

We are presently searching for seasoned data processing professionals with large integrated insurance systems experience especially with LIFE-COMM. There are several Programmer Analyst and Systems Analyst positions available, all of which have similar requirements. Prospective employees must have a large scale IBM background with strong knowledge of ALC or COBOL and TSO/ISPF, with strong analysis ability.

DATA PROCESSING/INSURANCE ADMINISTRATION PROFESSIONALS

We are presently searching for individuals who have hands-on experience with LIFE-COMM, preferably as a supervisor or analyst in the administrative or Model Office area. A minimum of three years life insurance industry experience and good analytical skills are required.

We offer a competitive salary, generous benefits package and career advancement. Qualified applicants please send resume to: **American General Services Company, P.O. Box 1931, Houston, TX 77251.** An equal opportunity employer, m/f. No agency inquiries, please.

AMERICAN GENERAL

IDMS Professionals

Florida Opportunities

AGS

AGS COMPUTERS, INC.

AGS Computers, Inc., leaders in professional systems development and software consulting, has immediate positions available in our Southeast Florida region for individuals experienced in:

IDMS, ADSO, ADSA

As a member of the AGS team, you will be challenged while working with our high tech clients. And you'll live in Southeast Florida, a world of great living and opportunity.

AGS offers an excellent salary, technical skills development, extensive benefits and relocation. To learn more about our opportunities in Southeast Florida, please mail your resume in confidence to:

Mary Piazza, AGS Computers, Inc., 800 Corporate Dr., Suite 210, Ft. Lauderdale, FL 33334.

An Equal Opportunity Employer M/F

Software Engineers

Electronics manufacturer specializing in video display technology is expanding its staff in St. Louis office. We have immediate need for experienced Micro Processor Software Engineers for new product development. We require Z80, 8088 or 68000 Assembly language experience. EE or CS degree or equivalent experience. Graphics hardware and software knowledge is preferred. Please send resume and salary history to

Kay Crider, Micro-Term Incorporated,
512 Rudder Road, Fenton, Missouri 63026.

SENIOR SYSTEMS PROGRAMMER
University of Wisconsin-Parkside

Excellent career opportunity in diversified environment. Manage area and direct support programmer. Responsible for installing, monitoring, troubleshooting, maintaining and supporting of system software and other proprietary packages on an IBM 4341 running VM/CICS/DOS/MANTIS; PDP 11/70 and VAX 750 running RSTSE/UNIX.

Position requires both technical and management skills. Requires a B.S. degree and minimum of two years systems programming experience on a large IBM system with complex operating systems. Experience with VM, DOS and CICS preferred. Digital system programming experience a plus.

Starting salary in low 30's depending on experience. Advanced educational opportunities available. UW-Parkside is a medium size university located in a pleasant suburban environment in southeastern Wisconsin.

Send resume to:

William M. Misamore, Director
Box 2000
Computer Center
University of Wisconsin-Parkside
Kenosha, WI 53141

AN EQUAL OPPORTUNITY EMPLOYER

---

500 +

DP OPENINGS SOUTHEAST LOCATIONS

P/A - ADABAS/NATURAL.................. to $45K
P/A - ACP/PARS, Airline....................... to $45K
P/A - COBOL/OS,
Banking Learn CICS .... to $30K
P/A - MVS, IMS DB/DC...................... to $40K
P/A - MVS, COBOL, MRP................ to $36K
P/A - MVS, ASSEMBLER .... to $36K
P/A - MFG., CICS, IDMS.................... to $35K
P/A, S/A - McCormick & Dodge .... to $38K
P/A - MVS, MSA .... to $33K
P/A - 38, RPG III, MAPICS .... to $35K
P/A - TANDEM/TAL........................to $33K+
P/A, S/P - DEC/VAX........................ to $36K
S/P - CICS .... to $40K
S/P - MVS.. to $40K
S/P - IMS, Learn XA.......................... to $40K
DB ANALYST - IMS, Banking............ to $45K
DB ANALYST - IDMS .... to $50K

For additional Information on these and other permanent or contract positions: call or send resume to Dave Kuratnick or Laree Shulman.

DATAMASTERS
P.O. Box 6888, Dept. A
Greensboro, NC 27415
919-373-1461 - collect

1000 DP Openings

MVS Sys Prog (1 yr)	27-40K
CICS Sys Prog (2 yrs OS/MVS or DOS/VSE)	27-40K
VTAM/NCP Sys Prog (2 yrs)	26-39K
IMS or IDMS Sys Prog (2 yrs)	25-38K
DEC Sys Prog (2 yrs VAX or PDP 11)	25-40K
ADABAS/Natural Prog/Anal (2 yrs)	27-40K
IMS DB/DC Prog/Anal (1 yr)	25-35K
CICS or IDMS Prog/Anal (2 yrs MVS or DOS)	25-35K
Assembler Programmer (2 yrs IBM)	25-30K
Honey L/66 Prog/Anal Sys Anal (2 yrs)	23-33K
Sys 38 Prog/Anal (2 yrs Mfg or Acct Apps)	24-33K
Tandem Prog/Anal (2 yrs)	24-35K
Burr 6800 Prog/Anal (2 yrs Mfg or Acct Apps)	25-30K
Univac 1100 Prog/Anal (2 yrs DMS 1100)	23-32K
HP 3000 Prog/Anal (2 yrs)	25-30K
Sys Anal (Mfg. Acct. or Mkt Apps)	28-39K
Insurance Prog/Anal (1 yr Ins Apps)	20-30K
Bank Prog/Anal Sys Anal (2 yrs Bank Apps)	22-33K
Mfg Prog/Anal Sys Anal (2 yrs Mfg Apps)	25-39K
DEC Software Engr (2 yrs VAX or PDP 11)	25-35K
Software Engr (2 yrs Z80 8080 or 6800)	25-40K
Software Engr (2 yrs UNIX "C")	25-35K
Electronic Warfare Software Engr (2 yrs)	25-40K
Data Base Anal (2 yrs IMS IDMS or ADABAS)	35-45K
EDP Auditor (2 yrs EDP Audit IBM)	26-33K

#1 employment agency #1 DP recruiter in the country for 1984 in NPC (100 agencies, 400 recruiters) **72% of my candidates get interviews!** Fee paid

Rick Young, CPC (704) 366-1800
Corporate Personnel Consultants, Inc.
3705 Latrobe Drive, Suite 310
Charlotte, N.C. 28211

RESEARCH STAFF MEMBER:

Will perform & disseminate independent research relating to theoretical computer science specifically related to design & analysis of algorithms for large scale parallel computers & large scale distributed computation systems, and the relation between different models of parallel & distributed computation systems. Will be involved in developing probabilistic tools for improving efficiency of sequential & parallel computation & developing new methods for probabilistic analysis of algorithms. Also will develop new methods for designing large scale fault tolerant systems. Reqs: PhD in Computer Science & 2 yrs. research exp. In related field; strong background in mathematics, Incl.: Combinatorics, Graph Theory & Probability Theory; in-depth exp. in design & analysis for large scale parallel & distributed systems, including probabilistic algorithms & probabilistic analysis of algorithms. Must have published original research in same. 40 hrs/week; $55K/yr. Job and interview site: San Jose, CA. Send this ad & resume & list of publications to Job # AT3188, P.O. Box 9560, Sacramento, CA 95823-0560, not later than May 20, 1986.

Experienced Wang VS programmer

for established Ft. Lauderdale based national nutritional firm with sales In excess of $30 million. Must be fully conversant with all aspects of VS O/S, including Wang utilities and SVC subroutines. Languages: COBOL, BASIC and VS Procedure. Prefer experience with designs using Speed II. Must be able to work closely with aggressive, entrepreneurial marketing and management staff. Their needs, their deadlines. Work with an office environment of over 50 friendly folks. Full company benefits, Including dental and major medical. 40 hour week. Salary to start $36K+ based on experience. Prompt raise evaluations. Send resume In confidence to: Park Taft, Dept. Comp. I, P.O. Box 2147, Hollywood, FL 33022

S.S. Pierce
COMPANY

Systems and Programming Supervisor

S.S. Pierce Company, a leader in the food service distribution industry, seeks a person with proven supervisory experience to oversee the systems and programming development effort within our MIS department. The selected candidate must have experience with the NCR VRX operating syatem, a programming background using COBOL language, and at least 5 years of solid experience Including some at supervisory level. Knowledge of NEAT and BOSS/3 a plus. Please send resume with salary requirements to: **Brian Duffy, Director of MIS, S.S. Pierce Co., Centennial Industrial Park, P.O. Box 6030, Peabody, MA 01960.** An equal opportunity employer.

Systems Analyst/Programmer: Plan and write computer programs for control systems that automate operations: Write complete sequence of machine instructions and routine necessary to complete processing cycle. Develop programs according to specifications and standards of both process and computer systems. Prepare flow charts, documents, and sequence logic; and methods of input, monitor, and display for open and closed loop, analog or digital systems. Write programs for such systems as Computer Based Process Control and Supervisory Control and Data Acquisition Systems for municipal water, wastewater and gas utilities markets. Must have a Master of Science degree in Computer Science, and one (01) year of experience as a Systems Analyst/Programmer. And must have at least one (01) year experience in the following computer languages: Assembler (UNIVAC AC-110), PL/1, Fortran, Cobol, Basic, Pascal, APL, 1100 DMS, RIM, RISS, OS, SPSS, 6502 and 6800 Assembler, RMX 86, PL/M. Forty hours per week at $2,295/$2,445 per month. Send a copy of this ad and your resume to Dick Hewetson, Job Order #6-34, MDES, 309 2nd Ave. Minneapolis, MN 55401.

Data Processing Manager responsible for the design, planning and production activities of electronic data processing division for medical center's financial management. Design, implement and develop new projects and provide ongoing growth of system capabilities. Reviews project feasibility studies and coordinate systems and projects. Develop systems proposals and cost justifications. Train and supervise personnel in all phases of computerized functions in data processing division. Special requirements: proficiency in COBOL and BASIC computer languages and extensive exposure to accounting systems. Experience on Wang VS and personal computers necessary. MS degree in Computer Science required. 2 years experience in job duties to be performed or 4 years experience in system analysis required. $30,000 per year based on a 40-hour work week. Report to Job Service of Florida, 105 E. Broward Blvd., Fort Lauderdale, FL 33301. Job Order #FL-5187500.

Equal Opportunity Employer

DIRECT CONTRACTS
N.Y., N.J., CONN., & L.I.

PRINCETON
INFORMATION LTD.

Leading Consulting Company
to $550/day

ALL SKILLS WELCOME
- UNIX C
- X.25, SNA
- Radar Software
- PASCAL
- ADABASE

2 PENN PLAZA, NY, NY 10001
212-563-5030

RESEARCH TRIANGLE OPPORTUNITIES

Currently recruiting experienced computer pros with background in any of the following. IBM Cobol mainframe applications, CICS, IDMS, ADABAS, IMS; RPGIII P/A, DP Auditor, MVS, IMS, NCP/VTAM or DEC Systems Progrs. Telecom Analysts, CAD Analysts, Order Entry, Mfg., Financial or Marketing Applications. McCormack & Dodge, AMAPS, MSA, VM Help Desk, Focus or VM Info Center, DEC Realtime Automation, SCADA Software. Partial listing of local, regional & nat'l fee paid positions. Call or write:

The Underwood Group, Inc.
3924 Browning Pl., Ste. 7
Raleigh, NC 27609
(919) 782-3024

Get your money's worth. Computerworld will lower your cost-per-hire.

When you're looking to fill MIS/DP positions, there's really only one place you need to advertise. Computerworld.

In every major market, Computerworld reaches more data-processing professionals than the local recruitment media. And we reach them for less.

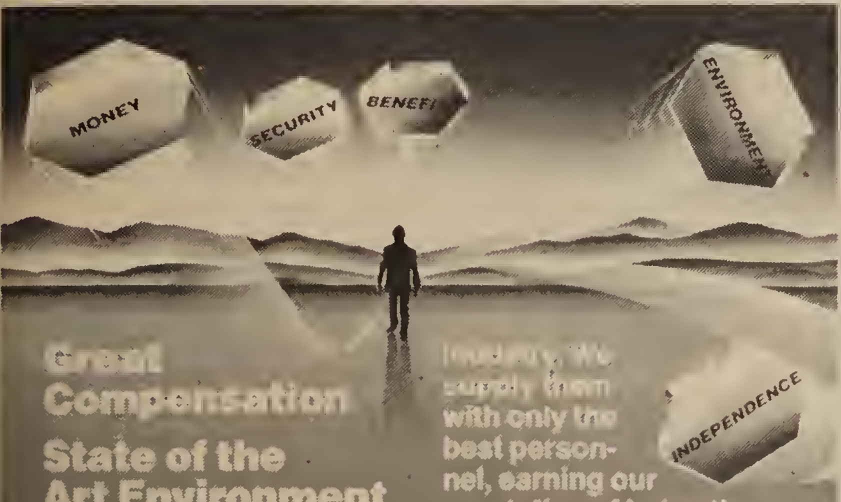
Over 600,000 computer-involved professionals receive Computerworld every week. That's more than any other computer trade journal, business publication, or general-interest magazine.

Computerworld delivers quality readership, too. Fully 41% of our subscribers read Computerworld's recruitment section every week. And 95% of our subscribers read this section regularly. The openings they advertised for cover the whole gamut of MIS/DP positions -- including systems analysts, computer science & software engineers, directors of MIS/DP, programmers, sales managers, and systems managers.

As a matter of fact, recruitment advertising has made Computerworld the national leader in classified advertising among specialized business publications (according to *Business Marketing* magazine).

Compare costs and the people reached. You'll find that Computerworld is the number one medium for computer-related recruitment advertising.

COMPUTERWORLD
Classified Advertising
P.O. Box 9171
375 Cochituate Road
Framingham, MA 01701-9171



Great Compensation

State of the Art Environment

Independence

Security

Benefits

These are the elements that make up the ideal position for the professional programmer.

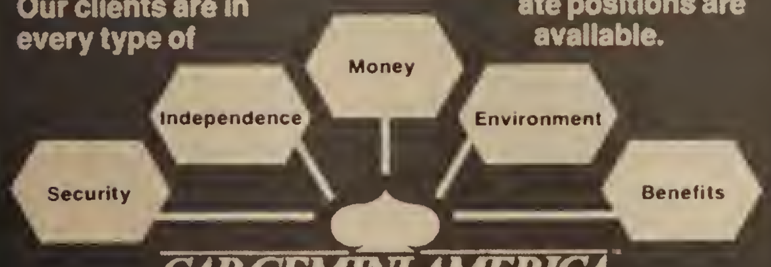
At CGA, we have been matching dynamic elements like these with highly qualified, confident, and motivated people for twenty years.

Our clients are in every type of industry. We supply them with only the best personnel, earning our reputation of being the number one quality consulting service in the business.

CGA employees are currently working in these areas:

- Custom Software Development
- Conversions
- Information Management Consulting

Let CGA assemble the ideal elements for your professional life. Call us today. Prior experience is requested and immediate positions are available.



CAP GEMINI AMERICA
212 West National Road
Vandalia, Ohio 45377
(513) 890-1200
1 (800) 543-7563
Equal Opportunity Employer
Sub-Contractors Welcome

SENIOR COMPUTER PROFESSIONALS

National Steel is out to become the first world class steel company in America. To help us get there we've joined with one of Japan's largest steel makers, Nippon Kokan—a leader in manufacturing technology.

We're committed to the manufacturing environment of the future and are in need of exceptional people to work on the development and implementation of shop floor, process control and business systems.

Our information systems plan to support this goal has created a need for the following senior level positions in:

- Database Administration
- Business and Manufacturing Systems
- Process Control
- Information Center

Over 5 years experience combining any of the following:

IBM 30XX
IMS DB/DC
COBOL
OS/JCL
TSO/ISPF
FOCUS
SAS
IBM PC
DATA GENERAL
DEC PDP11
RSX-11M+
DEC VAX
VMS
FORTRAN

We would like the opportunity to discuss your qualifications and career opportunities at National Steel. We offer excellent salary and benefits with highly visible development projects. Send your resume in confidence to: **Richard D. Supanich, Human Resources, Room 122.**

National Steel Corporation
One Quality Drive • Ecorse, MI 48229

National Steel

An Equal Opportunity Employer M/F

Software Engineers

COMPUTERPEOPLE DATA SERVICES is expanding its professional staff in our Columbus, Ohio office. We have several long-term consulting engagements with leading edge companies in central Ohio. We have immediate needs for experienced Mini/Micro Specialists to support client applications in telecommunications technology, telephony, and process control.

We require a BS degree (MS (PREFERRED) in computer science, math, or electrical engineering and practical experience in C and UNIX. Ideal skills include:

- Networking software-X.25
- Event driven real time experience
- CAD/CAM
- Color Graphics

We are looking for talented new employees. Send resume including salary history and academic GPA to Technical Service Manager, COMPUTERPEOPLE DATA SERVICES, 2550 Corporate Exchange Drive, Suite 100, Columbus, OH 43229. An equal opportunity employer.

COMPUTERPEOPLE
DATA SERVICES

LIMRA offers the opportunity to relocate to the Connecticut Valley area, an ideal working environment in a park-like setting in Farmington, competitive salary and benefits, relocation plan, a company-paid pension plan and the opportunity to use your creativity. We have the following positions available:

MANAGER OPERATING SYSTEMS SUPPORT

This individual will have experience in the management of technical staff, as well as, knowledge of operating system software. Experience in managing DEC VAX/VMS systems and/or Sperry VS/9 Systems is desirable.

SYSTEMS ANALYST

This individual will have a working knowledge of DEC VAX, office automation software (All-In-One experience is highly desirable), experience in doing needs and cost benefit analysis and IBM PC software experience.

If you are seeking a challenging and rewarding career and wish to explore this opportunity further, send resume with SALARY REQUIREMENT, in confidence, to: Paul D Martin, Employment Coordinator

LIMRA
INTERNATIONAL
P.O. Box 208,
Hartford, CT 06141
an equal opportunity employer m/f/h

MICRO PROGRAMMER/ ANALYST/ COORDINATOR

Experienced personal computer (IBM) programmer -- ability to originate programs in areas of no familiarity -- PC insurance knowledge a major plus. Excellent benefits. Please send resume including salary history in confidence to:

Marcella J. Eggemann
Personal Manager

millers mutual insurance
INC 1897
111 E. 4th Street
Alton, IL 62002
Equal Opportunity Employer

Selectivity...the Secret to EDP Career Advancement!

First...you must select the right EDP placement firm to represent you. That will be an NCA firm...here's why. NCA can show you far more excellent career opportunities, locally and nationally, than you are likely to find elsewhere...each of which is completely detailed. Then you combine that information with our "inside knowledge" of every computer installation and you have the secret to real career advancement. Only then can you intelligently select the position that really meets your immediate career objective.

Come in. Call. Or mail your resume to the NCA firm nearest to you. Confidentiality is assured. There is no charge to you ever for all our superb services.

BOSTON: Robert Kleven and Co Inc
North Brook Park Suite One 181 Bedford Street
Lexington Massachusetts 02173 (617) 861-1020
CHICAGO: Thos Hirtz & Associates
150 N Wacker Drive Suite 1700
Chicago Illinois 60606 (312) 977-1555
CINCINNATI: Task Group
7875 Reading Road Suite 21
Cincinnati Ohio 45237 (513) 821-8275
CLEVELAND: Innovative Resources
Statler Office Tower Suite 426
East Twelfth and Euclid
Cleveland Ohio 44115 (216) 621-4220
COLUMBUS: Michael Thomas Inc
450 W Wilson Bridge Road, Suite 340
Worthington Ohio 43085 (614) 846-0926
DALLAS: DataPro Personnel Consultants
12720 Hillcrest Suite 520
Dallas Texas 75230 (214) 661-8600
DENVER: Abacus Consultants Inc
1777 South Harrison Suite 404
Denver Colorado 80210 (303) 759-5064
DETROIT: Electronic Systems Personnel Inc
3000 Town Center Suite 2580
Southfield Michigan 48075 (313) 353 5580
FLORIDA: Data Sciences Personnel Inc
P O Box 8577
Hollywood Florida 33024 (305) 434-6112
HARTFORD: Compass Inc
900 Asylum Avenue
Hartford Connecticut 06105 (203) 549-4240
HOUSTON: Career Consultants Inc
1980 Post Oak Boulevard Suite 1050
Houston Texas 77056 (713) 626-4100

KANSAS CITY: D P Career Associates
6405 Metcalf Suite 502
Shawnee Mission, Kansas 66202 (913) 236-8288
LOS ANGELES: Superior Resources Inc
Personnel Service
6016 Fallbrook Avenue Suite 200
Woodland Hills, California 91367 (818) 884-3000
MILWAUKEE: EOP Consultants, Inc
Chancellory Park II
350 N Sunnyslope Rd , Suite 350
Brookfield, Wisconsin 53005 (414) 797-8855
MINNEAPOLIS: Electronic Systems Personnel
900 2nd Avenue South, Suite 880
Minneapolis Minnesota 55402 (612) 338-6714
NEW YORK: Botal Associates, Inc
7 Dey Street, Suite 410
New York New York 10007 (212) 227-7370
NEW YORK UPSTATE:
CFA Associates Personnel, Inc
5790 Widewaters Parkway
Dewitt, New York 13214 (315) 446-8492
NORTH CAROLINA: DataMasters,
Div of TaskForce, Inc P O Box 6888
Greensboro, North Carolina 27405
(919) 373-1461
PHILADELPHIA: Systems Personnel, Inc
115 West State Street
Media Pennsylvania 19063 (215) 565-8880
PHOENIX: Professional Career Consultants
4725 Scottsdale Road Suite 209
Scottsdale Arizona 85251 (602) 274-6666
SAN FRANCISCO: The Computer Resources
Group Inc Agency, 303 Sacramento Street
San Francisco California 94111 (415) 398-3535
SEATTLE: Houser Martin Morris & Associates
1940 116th Avenue N E
Bellevue Washington 98004 (206) 453-2700

National
Computer
Associates

CICS/IMS/VSAM DP Series

(Used by Over 20,000 DP Professionals)

CICS/VS Command Level Programming with COBOL Examples By David Lee $29.95
Complete & practical! It covers virtually every CICS technique you'll ever need. 273 practical examples, 15 sample CICS programs, printed in two colors, 295 8.5x11 big pages. BMS mapset coding, CICS program structure, coding, testing and implementation, Pseudo Conversational, Message Routing, CICS Internal table setup, CEDF debugging, Dump reading, Production Abend Handling, and more! Sample programs include: Menu, Add, Update, Delete, Browse, Browse/Update, 3 online report printing, VSAM primary & Alternate Index File Design, setup and manipulation, Screen Refreshing, Auto Task Initiation (ATI) and more!

IMS/VS DB/DC Online Programming Using MFS and DL/I By David Lee $29.95
Adopted by AT&T. It covers all the basics of IMS/VS online programming. 245 practical examples, 9 sample MPP programs, 310 8.5x11 big pages, printed in two colors. MFS Message formatting, MFS Format coding, DB/DC DL/I calls, MPP and BMP Program Structure, Coding, Testing and Implementation. BTS II Testing, Production Abend Handling and much more! Sample programs include: Menu, Add, Update/Delete, Browse, Online report printing, MPP using 2 Formats, Independent MPP program, and much more!

IMS/VS DL/I Programming with COBOL Examples By David Lee $29.95
Complete & practical guide to DL/I batch programming with introduction to IMS/VS Online programming. 212 practical examples, 10 sample DL/I programs, 305 8.5x11 big pages, printed in two colors. IMS/VS Environment, Data Base Concepts and Terminology, DB/DC DL/I call usage, DL/I batch program structure, coding, testing and implementation, JCL Coding for DL/I data bases, BTS II Testing, Four most-used Data Base Access Methods, IMS/VS Utilities (DBDGEN & PSBGEN), Data Base Load, Logical Data Base and Secondary Index Design and Implementation and much more!

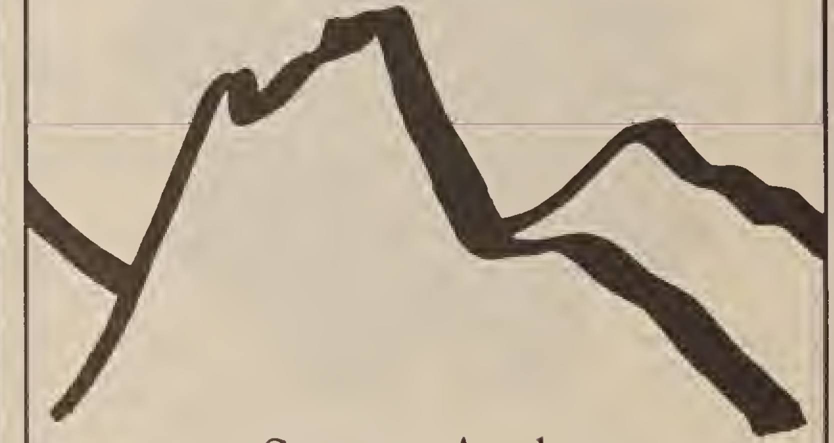
VSAM Coding in COBOL and VSAM AMS By David Lee $19.95
Become a VSAM expert in just one month! A practical guide for COBOL programmers using VSAM files. 14 COBOL sample programs address all VSAM applications. 53 AMS examples to satisfy all your needs to define & maintain VSAM files. 201 big technical-packed pages. Many practical examples. $17.95/copy for four (4) copies or more.

Order Your Copies Today! To order by credit card (VISA or M/C), call TOLL FREE 1-800-851-5072 or 214-248-7642 (in Texas). To save S&H charges, send $29.95/copy or $24.95/copy (4 or more copies) to the address below. Allow 1 to 2 weeks for delivery.

Unlimited Warranty: Full Refund At Any Time If Not Satisfied.

CCD ONLINE
CCD ONLINE SYSTEMS, INC.
TOLL FREE 1-800-851-5072
16990 Dallas Parkway, Suite 151, Dallas, TX 75248

Higher Technology.



Systems Analyst

Colorado Marketing Opportunity

The highest peaks in the country are in Colorado, and so is the highest technology in mainframe memory products. This year StorageTek will spend in excess of $60 million to keep it that way.

We are moving into a new marketing area for our storage and printer products and are seeking an individual who has excellent communication skills and recent experience with Control Data Cyber 170/180 hardware/software. The position requires 5-8 years experience on Cyber 170/180, along with the ability to interface with engineering, manufacturing groups and with customers. Travel is required; customer engineering experience is a plus.

We also have several openings around the country (Atlanta, Los Angeles, New York City, Washington, D.C.) for Product Marketing Specialists who have a minimum of 5 years computer-related marketing/sales experience.

StorageTek offers one of the finest compensation and benefit packages in the industry. For immediate consideration, please send your resume in confidence to, or call: Walt Arnason, Storage Technology Corporation, Department CW 47, 2270 South 88th St., MD29, Louisville, Colorado 80028, 1-800-367-4242, x-3142. We are an equal opportunity employer.

StorageTek

COMPUTER PROFESSIONALS

Our modern computer center in lower Manhattan. New positions are available for enhancements to on-line database system in a Sperry 1100/72 environment utilizing state-of-the-art hardware. We are seeking motivated candidates with Sperry 100 experience.

DATABASE ADMINISTRATOR

Responsibility for DMS 1100 generation, maintenance, and all database monitoring.

APPLICATIONS PROGRAMMERS

To work in a TIP-DMS environment. COBOL experience desired.

REQUIREMENTS:

B.A. and four years experience or equivalent in experience and training. Positions offer opportunity for advancement and excellent benefits package. Send resume to:

N.Y.C. Fire Department
Bureau of Personnel
250 Livingston Street
Brooklyn, N.Y. 11201
Attention: Mr. Dominic Morelli
Equal Opportunity Employer M/F.

CAROLINAS TO FLORIDA

Over 800 Client Companies (2 yrs. min. exp.)
— ALL FEES PAID —

MVS Sys Progs
CICS Sys Progs
Sys 36/38 P/As
P/As IBM Banking

Prj/Ldrs IBM Banking
DBAs IDMS/IMS/ADABAS
P/As IBM-IMS DB/DC
COBOL Prgs IBM/Train CICS

P/A ADABAS/NATURAL
P/A ADR/DATACOM
IBM Installation Consultant
Regional Mgr S/W House

OLD COLONY GROUP, INC.
4401 Colwick Rd., #310
Charlotte, NC 28211
Call Collect
704-366-1047

ALSO IN BOSTON — ORLANDO — LONDON
SALARIES $20,000^{00} TO $75,000^{00}
— COMPUTER PROFESSIONALS —

DATA PROCESSING SUPERVISOR

The Dutchess County Department of Mental Hygiene has an opening for a Data Processing Supervisor with 3 years experience as a Programmer/Analyst on Texas Instrument minicomputers or comparable systems. Must have good knowledge of COBOL and be capable of assisting and supervising other programming staff in the development of new applications, and maintenance of existing application systems. Environment consists of 2 networked 990/12 processors running DNOS with ETHERNET-based DNIO interface. Other important responsibilities include production scheduling and maintaining the operating environment. Starting salary is $25,202 with annual steps and cost of living increments. Send resume or call in confidence to: Eugene Warfel, M.A. Director, Office of Research & Evaluation, 230 North Rd., Poughkeepsie, NY 12601. (914) 485-9700.

Dutchess County is an Affirmative Action/Equal Opportunity Employer.

PROGRAMMING

SENIOR SYSTEMS PROGRAMMER

To act as System Manager for the Department of Chemical Engineering's VAX 11/785 and to serve as a focal point for information and communication concerning the VMS operating facilities. Requires Bachelor's degree with 4 years' effective experience or Master's degree with 2 years' effective experience, including coursework in computer science. Previous experience with VAX/VMS operating system and FORTRAN highly desirable. Send letter of application and resume by May 31, 1986, to Dean R. Byron Pipes, College of Engineering, UNIVERSITY OF DELAWARE, Newark, DE 19716.

The UNIVERSITY OF DELAWARE is an equal opportunity employer.

STUDENT INFORMATION SYSTEM PROJECT MANAGER

San Diego City Schools
$55,128 - $70,524 Annually
(1986-87 Salary Schedule)
Excellent Benefit Package

San Diego City Schools has a management vacancy responsible to provide overall leadership in development, direction, coordination and planning for acquisition and implementation of a new student information system for the person with a Bachelor's degree in Computer Science, Public or Business Administration with emphasis in information systems. Must have 8 years of progressively responsible data processing experience, 3 years of having been in project development management and system implementation.

Contact: San Diego City Schools, Attention: Ms. Haweda Nash, 4100 Normal St., San Diego, CA 92103, (619) 293-8159.

An Equal Opportunity Employer

DP PROFESSIONALS

Our rapidly expanding consulting firm has need of Programmers/Analysts with 2+ years experience in the following areas:

- **HP3000 (MM, PM a plus)**
- **HP 1000**
- **IBM System 34, 36, 38 (MAPICS, a plus)**
- **DEC VAX/PDP**
- **MVS SYSTEMS PROGRAMMING**

If you are interested in excellent salary and benefits as well as advancing your career in a stimulating professional growth environment, please send your resume in strictest confidence or call collect.

WESSON, TAYLOR, WELLS & Associates, Inc.
500 Archdale Dr. Ste. 202
Charlotte, NC 28210
Attn: Jim Wesson
(704) 527-0895

IMS DB/DC

The rapid growth of the computer industry in the Sunbelt has increased career opportunities for skilled programmers and analysts. Call today and join in the exciting challenge of our technological boom.

FOCUS
EDP Recruiters
3 Corporate Square, Suite 340
Atlanta, Georgia 30329
404-321-5400
1-800-423-1989-2236

FORTUNE 50 SOFTDRINK COMPANY

Corporate headquarters in Atlanta seeking Prog.'s, P.A.'s, S.A.'s, Sr. S.A.'s & DB Ana.'s. All position levels degree required, 2-15+ yrs. data processing exp. IBM M/F, IBM System 38 & ADABAS management potential state of the art systems. $25-45K+ DOE. Fee and reloc. paid. Top benefits. Call or send resume to

B. Badon Recruiter
Badon's DP Division
921 N. Lobdell Blvd.
Baton Rouge, LA 70806
(504) 927-7406

POSITION REOPENED

JOIN THE DEPARTMENT OF EDUCATION MANAGEMENT TEAM

System Programmer/Operations Supervisor experienced with CICS, VSAM, DOS/VSE, and COBOL. Knowledge of IBM S/370 or IBM 4300 series equipment and operating system software. Complete job description upon request. Salary competitive. Excellent benefits. Deadline May 19. Contact:

Stanislaus County
Dept. of Education
Personnel Office
801 County Ctr. III Court
Modesto, CA 95355
(209) 571-5835
EOE

EDP AUDIT MANAGER. $50K. Manage staff of EDP auditors and build a staff to audit newly purchased bank. IBM 3083 MVS/SP-1, CICS, TSO, Tandem-2, COBOL, Assembler, CISA preferred. Call/send resume to Dept. C69, MSI, 400 Perimeter Ctr. Terr., #820, Atlanta, GA 30346. (404) 394-2494.

SR. COMPUTER SOFTWARE SPECIALIST

Sacramento County is accepting applications and application supplements for Senior Computer Software Specialist to support VM/CMS. Work involves planning, installation, maintenance and performance tuning VM/CMS and related software. Also project management, scheduling and training. MVS experience preferred but not required. Apply at Department of Personnel Management, 700 H St., Ground Level, Sacramento, CA 95814, (916) 440-5593. Salary $40,131 - $44,245/year.

CONSULTANTS to $400/DAY

$70,000

PER ANNUM

NYC/NJ/Ct

Call or forward resume to:

PARAMOUNT CONSULTANTS CORP
95 MADISON AVENUE
New York, New York 10016
(212) 684-6606

Expansion Position In Southeast

Client company is seeking Programmer Analyst and Systems Analyst. Candidate must have the following qualifications: large IBM, OS/MVS, Cobol, CICS or IMS, and some Data Base experience. Relocation and fee paid. Send resumes to Sherry Ramsey, **Dunhill Of Chapel Hill**, 1829 East Franklin Square, Building 500, Chapel Hill, NC 27514 or call (919) 968-8200 or (800) 533-8339.

DATA PROCESSING Southeast & National

We specialize in data processing on a national level, at no cost to the candidate.

- **P/A-BAL & COBOL, 3+ yrs exp — FL to $35K**
- **P/A,S/A-3+yrs COBOL exp & banking applications — FL $27-$35K**
- **APP PROGS-COBOL,ASSEMBLER,IDMS,multi-vender, 1+ yrs exp — SE/MIDWEST to $37K**
- **P/A-3+yrs exp,lge IBM mainframe, insurance & mfg applications, IMS DB/DC,OS/MVS,TSO/ISPF,COBOL, PL/1,CICS — MIDWEST to $36K**

Send resume in confidence to G Holzmann

PROFESSIONAL PERSONNEL CONSULTANTS, INC.
P.O. Box 23786, Tampa, FL 33623
813-877-7008

There's No Time For DOWNTIME!

And that goes for your business as well as your computer system!

So, while the industry works on your system's problems, let us work on your business problems. Advertise in--

COMPUTERWORLD CLASSIFIEDS!

One insertion will let a potential audience of over a half a million readers know what you are looking for or have to offer. Whether you are looking to recruit computer professionals, want to buy, sell or lease equipment, have computer time or services to offer, or software packages to sell, and more, **Computerworld Classifieds** will help you get a lot of exposure and get things done faster.

The open line rate is $11.55 per line and there is a minimum size of 1 column by 2'' at a cost of $323.40. We can accomodate up to 5 columns and depth measurement increases by half inch increments.

Ads may be mailed in, cleanly typewritten, with a letter stating the size desired and the issue in which it is to be run. Our adtakers will take ads that require no extensive artwork or borders over the phone. We also provide telecopier service.

Any borders, logos, or artwork should be sent in with your ad and must be dark and clear enough to be reproduced.

Computerworld comes out every Monday and our deadline for receiving ads is 10 days (or six working days) prior to the issue date desired.

First time advertisers must send either payment or a purchase order along with their first ad.

Our mailing address is:

Computerworld
Classified Advertising,
Box 9171, 375 Cochituate Road,
Framingham, Mass. 01701-9171
800 343-6474; (617) 879-0700

Data Processing Professionals

WHO'S COMMITTED TO EXCELLENCE IN THE D.P. INDUSTRY?

AUXCO

With 1986 projected revenues of $36 million and a growth rate of 30%, our need for additional **SYSTEMS PROGRAMMING** and **APPLICATIONS PROFESSIONALS** has never been greater.

Auxton Computer Enterprises, Inc. (AUXCO), a recognized leader in the management consulting and software industry, addresses the data processing needs of Fortune 500 companies both nationally and world wide.

SYSTEMS PROGRAMMERS

Candidates should have 5 years plus experience in systems programming. Must be fully knowledgeable of MVS/XA internals, support, and maintenance Additional experience in IBM products such as CICS, IMS DB, TSO/E, SPF, RACF a plus.

APPLICATIONS PROFESSIONALS

Candidate should possess 2 years plus experience in online programming using COBOL and CICS. DL-1 and VSAM a plus.

Since our employees are our most valuable resource, members of the AUXCO team enjoy unparalleled career growth, training and a unique opportunity for financial success.

Join our commitment to excellence. For information regarding opportunities throughout the United States, send resume to:

Jan Ackerman

Auxton Computer Enterprises, Inc.
Corporate Headquarters
851 Trafalgar Court
Suite 300W / Dept. CW55
Maitland, FL 32751

Equal Opportunity Employer

As financial information processing needs become more complex, the demands for highly efficient computer systems capable of meeting those needs increase. At Systeme Corporation, our commitment to meeting those needs now and in the future has made us an industry leader. This dynamic growth has created career opportunities for forward-looking professionals who want to meet tomorrow's data processing needs today.

System 36/38 Programmers

Commercial Banking Applications

We are currently seeking System 36/38 programmers with 2-3 years experience that possess the following qualifications:

- **You should have experience with some or all of the following banking applications: Automatic Transfer System, Certificates of Deposit, Consumer Loans, Demand Deposits and Savings, General Ledger, Payroll, Proof of Deposit and Mortgage Loans.**
- **RPG and COBOL programming language**
- **System 36/38 hardware experience**

In addition to a great Florida lifestyle, we offer an outstanding salary and benefits package that includes excellent relocation assistance. And the absence of state income tax allows your salary to go even further. If you would like to join a company that's moving fast into the future, please send your resume to: **H.C. Kresge, Jr., Vice President of Administration, Systeme Corporation, 3443 Parkway Center Court, Orlando, FL 32808.**

système

More than a system.
A commitment.

An Equal Opportunity Employer

★ TAX FREE INCOME ★

W. GERMANY ★ S. AMERICA ★ S.E. ASIA ★ MIDEAST
EUROPE ★ KOREA ★ S. PACIFIC ★ EGYPT ★ TURKEY

We have more jobs available than any other Agency in the country.

OVER 11,500+OPENINGS AVAILABLE IMMEOIATELY!

FREE TRAVEL FREE HOUSING
FREE FOOD FREE MEDICAL

Our Clients are hiring NOW for all major systems, micro and mini computer:

PROGRAMMERS ANALYSTS SOFTWARE ENGRS.
TECHNICIANS O.P. MGRS MACH. ENGRS.

•MANY, MANY OTHERS•

OPEN SUNDAY 9-3 PST

Weekdays 8:30-5:30 p.m.

Call or send resume to:

Overseas Unlimited Agency, Inc.

CALL NOW

(213) 739-8080

3460 Wilshire Bl., Ste 908CW, Los Angeles, CA 90010

OR CONTACT

(208) 344-0442

290 Bobwhite Ct Ste 240CW Boise ID 83706
FOR the following states only ID, MT, ND, OR, SD, WA, WY

OR CONTACT

(813) 985-7300

7402 N 56th St Ste 800CW Tampa, FL 33617
FOR the following states only AL, AR, FL, GA, KY LA MD, MS, NC, SC, TN, VA, DC, WV

OR CONTACT

(201) 624-3700

Gateway One (at Penn Sta.) Ste 501CW Newark NJ 07102
FOR the following states only CT DE ME MA, NH, NJ NY PA, RI, VT

Advance Fee of $430.00 refundable if we fail to match you with a minimum of 3 positions within 15 working days. Employment not guaranteed. Licensed and Bonded.

EDP CONSULTANTS

Boston/N.E. Areas
3+Years' Experience
High Rates

MIS

☐ WANG VS
☐ ADABAS/NATURAL
☐ 4GL i.e.; FOCUS, M204, NOMAD
☐ CICS/IMS/IDMS
☐ MUTUAL FUNDS, SECURITIES

SOFTWARE

☐ VAX/PASCAL w/INGRES a+
☐ R/T COMMUNICATIONS w/VAX/MACRO, JOVIAL OR PASCAL
☐ X.25-COMMUNICATIONS PROTOCOLS
☐ R/T SYSTEMS w/ADA

Mention this ad when you call Wayne Robison at (617) 894-9500.

Data Arts & Sciences, Inc.

Contract Consultants

DASI

13 Riverside Rd., Weston, MA 02193

COMPUTER SYSTEMS ANALYST wanted to design, develop and implement statistical analysis software comprised of Statistical Process Control, Experimental Design, Taguchi Methods and Computer-Aided Parameter Design using "C", PL/M51, 80286 and 8051 ASM languages under UNIX, XENIX, VAX/VMS and PC-DOS operating environments; design and implementation of BITBUS, OPEN-NET and RS-232 Communication protocols for Virtual Terminal and Tektronix 4014 Emulation interfaces with the INFORMIX data base management system; and, design implementation of MULTI-BUS I and II control applications for Computer Integrated Manufacturing using Real-Time Industrial Control Scheme via A/D and D/A signal conversion in conjunction with MAP architecture; Requires M.S. degree in Computer Science; One year experience; $30,000.00 per year; 40 hours per week. Send resume to 7310 Woodward Avenue, Room 415, Detroit, Michigan 48202. Ref. No. 26286. "Employer Paid Ad"

Systems Analyst - Must have M.S. in Computer Science and 1 year experience in Assembler language and hardware interfacing. Responsible for circuit design, network analysis and developing programs in Assembler language. 40 hours per week. Salary $30,000 per year. Send resume to NYS Job Service, JO #NY8012292, 97-45 Queens Blvd., Rego Park, NY 11374.

ADR. CALL US BEFORE YOUR BRAIN GOES DEAD.

"Hello ADR, I've got a candidate for you."

There's nothing worse for a creative thinker than a job that offers you little or no chance to think. Without a challenge it's too easy to switch your brain into automatic. Which is not too far from switching it off altogether.

At ADR we pride ourselves on keeping our brains alive. With the challenge of developing new and better software systems. Everything from relational date base technology to PC products. That's how ADR has become one of the world's largest software companies. And why we're still growing.

A creative brain with a solid IBM mainframe and BAL background is what you need to get going again with ADR. That also gets you a good salary and benefits package—including relocation assistance—as well.

So if you feel like everything is going numb, call Mr. Gary Johnson at 1-800-ADR-WARE before it's too late. Or write to him c/o Applied Data Research, Orchard Road & Rt 206, CN-8, Princeton, NJ 08540.

ADR HELP US WRITE THE HISTORY OF SOFTWARE

AN AMERITECH COMPANY

© 1986 ADR

Lachman Associates, Inc.

Committed to Software Excellence!

LAI is a systems software development and consulting firm that can use your talents in UNIX, MVS, C, Telephony, and Networking! We have over 100 full time salaried professionals, and have been leaders in UNIX related software development for the past 7 years. We promote the professional growth and fulfillment of our staff by providing a wide range of high quality services and products for our clients.

Opportunities in network communications, systems and telephony software, and systems admin/testing in Chicago, Columbus, Denver, Florida, and other locations. Geographical flexibility a real plus! For further information, please contact:

Lachman Associates, Inc.
Attn: Staffing-CW
645 Blackhawk Drive
Westmont, IL 60559

UNIX is a trademark of AT&T

DATA COMMUNICATIONS

LAN Consultant

Experienced professional to serve as networking consultant to academic departments of the University. Assist users with requirements definition, planning and operating LAN's, and connecting them to SUNet (Stanford's cross-campus video and data network). Prepare configurations and bid requests, oversee installation, teach, give demonstrations, write and review networking documents. Test new products and recommend support strategies.

Qualifications: working experience with Ethernet, micro nets. Prefer some broadband experience. Excellent written and oral expression. Ask for detailed job description. Dynamic work environment, salary commensurate with experience, and excellent benefits.

Send resume and cover letter to Kathy DeMoulin, Old Pavilion Personnel Dept., #40217 - CW, Stanford University, Stanford, CA 94305. An equal opportunity employer through affirmative action.

Stanford University

DATA PROCESSING MANAGEMENT OPPORTUNITIES

SYSTEMATICS, INC.

Systematics is a leading supplier of software products and services to the financial industry. We serve over 800 financial institutions nationwide.

We are interviewing individuals having strong managerial skills and experience. Company growth has provided opportunities in the following areas:

- **Loans Application Development Management**
- **Technical Services Management (IBM Operating Systems)**
- **Documentation Management**
- **Project Management**
- **Data Center Management**
- **Management in other areas related to financial industry**

All positions require experienced Managers with motivation for personal and organizational success. We offer career growth and opportunity in a progressive, professional environment.

If you are a qualified candidate and are committed to excellence, please call:
(501)-223-5249
or send your resume with salary history to:
Katherine Becker, Regional Recruiting Manager
SYSTEMATICS, INC.
4001 Rodney Parham Road, Little Rock, Arkansas 72212
An Equal Opportunity Employer M F Principals only please

SYSTEMATICS, INC.

DANIEL®

COMPUTER ASSISTED ENGINEERING

Daniel Engineering provides engineering design services to the foods, metals, pharmaceutical, fine chemical and pulp & paper industries. To remain competitive and to provide added value to our clients, Daniel has made a major commitment to Computer Assisted Design, which includes 36 Intergraph and 14 Calma work stations. We need well qualified and motivated individuals to help manage these state-of-the-art systems.

COMPUTER OPERATIONS SUPERVISOR-BS in Computer Sciences or Computer Engineering with at least 5 years experience in large computer operations. Experience on Apollo and DEC VAX systems preferred.

SYSTEMS ANALYST-BS in Computer Sciences with 4 years experience on Intergraph systems, VAX and Micro VAX based systems-ETHERNET networked. Background in Intergraph and Calma installation helpful. Prior system troubleshooting in various graphic and non-graphic operations a plus.

SYSTEMS PROGRAMMER-BS in Computer Engineering or Computer Science with at least 4 years experience in design and programming. Must have good experience in COBOL and Fortran programming. Highly desirable to have some experience on DEC, DCL, Utilities and Intergraph. Database and engineering applications programming a plus. Teamwork essential.

In addition to a nationally competitive salary structure, we offer many improved benefits. These include short term disability, salary continuation, accidental death coverage, medical insurance, corporate retirement plan, plus pre-tax benefits and savings plan.

To inquire about these opportunities, send your resume, including salary history and requirements, in complete confidence to: **Roby Miller, DANIEL, Daniel Building, Dept. 3-0526, Greenville, SC 29602.**

Equal Opportunity Employer M/F

EMPLOYMENT SERVICE FOR PROGRAMMERS AND ANALYSTS

National Openings With Client Companies
and Through Affiliated Agencies

Scientific and commercial applications • Software development and systems programming • Telecommunications • Control systems • Computer engineering • Computer marketing and support

Call or send resume or rough notes of objectives, salary, location restrictions, education and experience (including computers, models, operating systems and languages) to either one of our locations. Our client companies pay all of our fees. We guide: you decide

RSVP SERVICES, Dept. C
Suite 700, One Cherry Hill Mall
Cherry Hill, New Jersey 08002
(609) 667-4488

RSVP SERVICES, Dept. C
Suite 201, Dublin Hall
1777 Walton Rd Blue Bell, PA 19422
(215) 629-0595

From outside New Jersey, call toll-free 800-222-0153

RSVP SERVICES
Employment Agents for Computer Professionals

UNIVAC

Programmers, Systems Analysts, Data Base Analysts, Systems Programmers-Let us update you on the rapidly changing UNIVAC market coast to coast. To confidentially explore exciting new career opportunities, rush a resume or call Gary Repetto, CPC.

DUNHILL OF ALBUQUERQUE, INC.
1717 Louisiana NE, Suite 218
Albuquerque, NM 87110
(505) 262-1871
Exclusively Employer Retained

DALLAS

Space age client needs Sr. Firmware, Hardware and Software Engineers. (Receiver, MIC Analog, Digital Proc., RF/IF Comm., AI, etc) B.S. or M.S. E.E.'s, math, physics, or computer science required. U.S. Citizen. Top Bennies & Relocation. Fee Paid.

2720 Stemmons Frwy., 1207C
Dallas, TX 75207, (214) 637-6360
DATA PROCESSING CAREERS inc

TEAM PLAYER?

Technalysis is a nationwide consulting services firm. We are currently building teams of competent, experienced system design, analysis and programming personnel to work on a large HP3000 development project in TRANSACT/3000. Our current positions require excellent communication skills and relocation to Michigan.

Send Resume Immediately to:

TECHNALYSIS CORPORATION

20100 West Civic Center Dr.
Southfield, MI 48076
(313) 352-2440
Equal Opportunity Employer

Systems Analyst - Determine hardware and software requirements; direct preparation of system studies, analysis and proposals for development of computer systems; verify technical specifications; design and implement systems including supervision and evaluation of EDP staffs and installation, maintenance and software design. Detect, diagnose and correct problem areas. Prepare user manuals and provide recommendations for upgrading and improving operating efficiency. Bachelor's degree in Computer Science, Mathematics or Engineering and 3 years experience as a Systems Analyst required. Experience must include work with large scale IBM Series 370 and 30XX mainframe computers, COBOL, Assembler, CICS, VSAM and OS/MVS. 40 hrs/wk, $37,000 per annum. Reply by resume only to Mass Div. of Employment Security, C.F. Hurley Bldg., Boston, MA 02114. Refer to Case #6495.

Computer Technician - Provide technical support to customers for Digital for KL-10 and associated peripherals to include KI-10 and KA-10. Instruct staff and customers on use of Digital's KL-10 processor, DECsystem-10 peripherals, KI-10 and KA-10 peripherals. Requires 4 years experience in field or as Instructor. $709.00 per week, 40 hr., 5 day wk. Report to: New Jersey Job Service, 277 George St., New Brunswick, NJ 08901. JO #0663347. NO FEE CHARGED.

Systems Engineer for consultant firm in Cincinnati, Ohio. Will develop, test, integrate and debug banking software applications for user compatible hardware in the automation of universal financial systems. Will research and test multi-user computer systems and programs with integrated electrical systems utilizing problem solving mathematical applications and COBOL programming for computer aided design, development, and debugging of financial systems. Requires Bachelor's degree in Math or Computer Science. Academic coursework must include 1 semester or quarter each in: financial management or accounting, operations research, computer aided design, COBOL programming, multivariate analysis, and statistics. 40 hour week, salary $25,000 per year. Send resume, transcripts, and ad to L. Ellison, Ohio Bureau of Employment Services, P.O. Box 1618, Columbus, Ohio 43216, Attn: J.O. #0595782.

TECHNICAL CONSULTANT - To train and educate prospective customers, and support a computer simulation software package called SEE WHY– a FORTRAN-based product used to build computer models of problems and displaying models on a computer screen using a color graphics representation of the facility being modelled. Salary is $54,000.00 per year, no overtime, basic 40 hour week. Work Schedule - 9:00 a.m. to 5:00 p.m. Requirements: High School Graduate; Master's Degree with Major Field of Study in Operational Research, three years experience in job offered. The three years experience shall include work with SEE WHY–a FORTRAN based computer simulation product as a business necessity. Send resume to: MESC, 7310 Woodward Ave., Room 415 (Reference No. 16086) Detroit, MI 48202. Employer paid ad.

DIRECTOR OF COMPUTER SERVICES

Colby seeks Director to assume responsibility for overall planning and management of computer services, both academic and administrative. Computing environment includes VAX 8200, two VAX 11/750's running UNIX and the Apple Macintosh as the standard microcomputer.

Colby seeks persons with proven managerial ability and experience in teaching/research institution(s).

Closing date is June 9, 1986. Apply:
Dr. Stanley A. Nicholson
Administrative Vice President
Colby College
Waterville, Maine 04901

MANAGER TECHNICAL SUPPORT

Progressive on-line computer installation IBM, MVS/XA seeks a manager to supervise systems programming, communications and data base.

ROMAC®
Metro Center
88 Elm Street, Ste 700
Rochester, NY 14602
716-232-4610

Software Sales Representative

We need two sales representatives for telephone marketing of MVS oriented system software. The system is recently introduced in North America and the first installations are made here now.

Location may be anywhere in the eastern states and in Toronto. Attractive commission and travels to Europe.

Call (201) 778-5151 - ask for Leif Fogelberg during May 5-8 or write to us.

Fogelberg & Rella, Inc.
120 Brighton Road
Clifton, NJ 07012

RSD worldwide leader in Reports Management System with WSF2 is offering career opportunities for

System Engineers

with the following technical experience:

- *** IBM MVS SP/XA, JES2/JES3**
- *** TSO-ISPF, VTAM, CICS, ASSEMBLER H**

for technical support (based in our New York office) to current and future users of our advanced systems software products throughout the states.

Qualified candidates
RSVP in confidence to:
CW-B4785, Computerworld, Box
9171, Framingham, MA 01701-9171

DP PROFESSIONALS TO $65K+

Programmer/analysts, systems programmers, project leaders, etc. with experience in COBOL, PL/I, FORTRAN, ASSEMBLER, DBMS, CICS, and/or ACP/TPF are urgently needed to fill positions at our client sites in various parts of the country.

Please reply, in confidence, to:

S.S.S.
SYSTEMS SOFTWARE SPECIALISTS, INC.

12629 N. Tatum
Suite 128
Phoenix, Az. 85032

955 W. Lancaster Rd.
Suite 250
Orlando, Fl. 32809

CLASSIFIED ADVERTISING ORDER FORM

Issue Date: Ad closing is every Friday, 10 days prior to issue date.

Sections: Please be sure to specify the section you want: Time and Services, Software for Sale, Position Announcements and Buy/Sell/Swap. (Available upon request: Software Wanted, Real Estate, and others).

Copy: We'll typeset your ad at no extra charge. Please attach CLEAN typewritten copy. Figure about 25 words to a column inch, not including headlines. Any special artwork should be enclosed with your ad also. Logos must be submitted on white bond paper for best reproduction.

Cost: Our rates are $161.70 per column inch. (Each column is 1 13/16") Minimum size is two column inches (1 13/16" wide by 2" deep) and costs $323.40 per insertion. Extra space is available/and billed in half-inch increments and costs $80.85. Box numbers are $15.00 extra per insertion.

Billing: If you're a first-time advertiser, (or if you have not established an account with us.) WE MUST HAVE YOUR PAYMENT IN ADVANCE, or a Purchase Order Number. Any extensions on this policy must be made through our Credit Department.

Ad size desired: ____________________

________ columns wide by ________ inches deep.

Issue Date(s): ____________________

Section: ____________________

Name: ____________________

Company: ____________________

Title: ____________________

Address: ____________________

____

Telephone: ____________________

Send this form to:

COMPUTERWORLD
CLASSIFIED ADVERTISING
375 Cochituate Road
Box 9171
Framingham, MA 01701-9171

Telecopier service is available.

Call: 800-343-6474 or 617-879-0700
extension 410 or 451

Computerworld Sales Offices

Publisher/Vice-President/Donald E. Fagan

VP/Sales/Edward P. Marecki
Manager/Marketing & Sales Operations/Kathy Doyle
COMPUTERWORLD. 375 Cochituate Road, Box 9171,
Framingham, MA 01701-9171
(617) 879-0700

BOSTON SALES OFFICE (617) 879-0700
Northern Regional Manager/Ronald Mastro
District Managers/Jim McClure, Michael F. Kelleher
David Peterson, Bill Cadigan
Account Manager/Sherri Driscoll
Sales Assistant/Alice Longley
COMPUTERWORLD. 375 Cochituate Road, Box 9171,
Framingham, MA 01701-9171

CHICAGO SALES OFFICE (312) 827-4433
Midwest Regional Manager/Russ Gerches
District Manager/Kevin McPherson
Sales Assistant/Jean F. Broderick
COMPUTERWORLD. 2600 South River Road, Suite 304,
Des Plaines, IL 60018

NEW YORK SALES OFFICE (201) 967-1350
Eastern Regional Director/Michael J. Masters
Senior District Manager/Doug Cheney
District Managers/Joan Daly, Fred Lo Sapio, Frank Genovese
Account Manager/Gale M. Paterno
Sales Assistants/Mary Burke, Sue Larson
COMPUTERWORLD. Paramus Plaza I,
140 Route 17 North, Paramus, NJ 07652

LOS ANGELES SALES OFFICE (714) 261-1230
District Managers/Bernie Hockswender, Carolyn Knox
Western Regional Director/William J. Healey
COMPUTERWORLD. 18004 Sky Park Circle, Suite 255,
Irvine, CA 92714

SAN FRANCISCO SALES OFFICE (415) 421-7330
Western Regional Director/William J. Healey
Senior District Manager/Barry Milione
District Managers/Ernie Chamberlain, Mark V. Glasner,
Account Manager/Diane Fuller
Account Manager, Classified/Nicole Boothman
COMPUTERWORLD. 300 Broadway, Suite 20,
San Francisco, CA 94133

ATLANTA SALES OFFICE (404) 394-0758
District Manager/Jeffrey Melnick
Eastern Regional Director/Michael J. Masters
Sales Assistant/Melissa Christie
COMPUTERWORLD. 1400 Lake Hearn Drive, Suite 330,
Atlanta, GA 30319

DALLAS SALES OFFICE (214) 991-8366
District Manager/Mark V Glasner
Western Regional Director/William J. Healey
COMPUTERWORLD. 300 Broadway, Suite 20,
San Francisco, CA 94133

CLASSIFIED ADVERTISING (617) 879-0700
National Recruitment Sales Manager/Al DeMille
Recruitment Account Executives/Geoff Dodge,
Derek E. Hulitzky
COMPUTERWORLD. 375 Cochituate Road, Box 9171,
Framingham, MA 01701-9171
CW INTERNATIONAL MARKETING SERVICES
Managing Director/Frank Cutitta
COMPUTERWORLD. 375 Cochituate Road, Box 9171,
Framingham, MA 01701-9171
(617) 879-0700

COMPUTERWORLD. 1060 Marsh Road
Menlo Park, CA 94025
(415) 328-8064

CW Communications/Inc.

Board Chairman	President	Executive Vice-President
Patrick J. McGovern	W. Walter Boyd	Lee Vidmer

Publisher/Vice-President, Donald E. Fagan. **Senior VP-Communication Services,** Jack Edmonston. **VP-Sales,** Edward P. Marecki. **Group VP-Circulation,** Margaret Phelan. **VP-Finance,** William P. Murphy.

Computerworld Headquarters: 375 Cochituate Road, P.O. Box 9171, Framingham, MA 01701-9171
Phone: (617) 879-0700, Telex: 95-1153.

SALES **Vice President,** Edward P. Marecki. **Manager/Marketing & Sales Operations,** Kathy Doyle. **National Recruitment Sales Manager,** Al DeMille. **Display Advertising Manager,** Anne Hadley. **Senior Coordinator,** Carolyn Medeiros. **Display Advertising,** Maureen Carter, George W. Griffin, Joy Forman. **Classified Operations Manager,** Cynthia Delany.

COMMUNICATION SERVICES **Senior Vice-President,** Jack Edmonston. **Director Research,** Kathryn Dinneen. **Sales Promotion Director,** Liz Johnson.

PRODUCTION **Production Director,** Peter Holm. **Production Manager,** Marlene Stibal. **Paste-Up Manager,** Patricia Gaudette. **Typesetting Manager,** Carol Polack. **Art Director,** Tom Monahan.

CIRCULATION **Group Vice-President,** Margaret Phelan. **Circulation Director,** Nancy L. Merritt. **Corporate Fulfillment Director,** Maureen Burke.

CONFERENCE MGT. GROUP **President,** William R. Leitch.

MIS **Corporate Director MIS,** Jeff Cordeiro.

Computerworld can be purchased on 35 mm microform through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106.
Phone: (313) 761-4700. *Computerworld* is indexed: write to Circulation Dept. for subscription information.

Foreign Editorial/ Sales Offices

Argentina: Ruben Argento, Computerworld Argentina, Av. Belgrano 406-Piso 9, CP 1092 Buenos Aires. Phone: 34-5583/5584. Telex: 22644.

Asia: Euan Barty, Asia Computerworld Communications Ltd., 701-4 Kam Chung Bldg., 54 Jaffe Road, Wanchai, Hong Kong. Phone: (05) 8L63238. Telex: 72827 (COMWR HX)

Australia: Alan Power, Computerworld Pty. Ltd., 37-43 Alexander Street, Crows Nest, NSW 2065. Phone: (02) 4395133, Telex: AA74752 COMWOR.

Brazil: Eric Hippeau, Computerworld do Brazil, Rua Pedroso de Morais 1553, 05419 Sao Paulo, SP Brazil. Phone: 814-9658-212-8750. Telex: 11 32017 (WORD).

Denmark: Preben Engell, Computerworld/Danmark A/S, Torvegade 52, 1400 Copenhagen K, Denmark. Phone: (01) 955 695. Telex: 31566.

France: Axel LeBlois, Computerworld Communications S.A., 185 Avenue Charles De Gaulle, 92200 Neuilly Sur Seine, France. Phone: 747 1272. Telex: 613234 F.

Hungary: Dezso Futasz, SZT Computerworld, P.O. Box 386, Budapest, 1536, Hungary.

Italy: Daniele Comboni, Computer Publishing Group S.R.L., Viale Restelli 5, 20124 Milano. Phone: (2) 688 9773. Telex: 333436 (GEJIT).

Japan: Mr. Shuji Mizuguchi, Computerworld Japan, 7-4 Shintomi 1-Chome, Chuo-ku, Tokyo 104. Phone: (03) 551-3882, Telex: 252-4217 (Computerworld Japan only).

Steven Yamada, Tokyo Representative Corp., Sanshin Kogyo Bldg., 2-10 Kando Jimbocho 3F, Chiyoda-ku, Tokyo 101, Japan. Phone: 230-4117, Telex: J26860 (reps for all CWCI publications except Computerworld Japan).

Mexico: Henry Morales, Computerworld Mexico S.A. de C.V., Oaxaca 21-2, Mexico City 7 D.F. Colonia Roma, 06700 Mexico. Phone: (05) 514-4218. Telex: 177 1300 (ACHAME).

The Netherlands: Wout Berends, CW Communications B.V., van Eeghenstraat 84, 1071 GK Amsterdam, The Netherlands. Phone: (020) 64 6651. Telex: 18242 (CWCOM NL).

Norway: Mr. Morton Hansen, CW Norge A/S, Hovinveien 43, P.O. Box 2862, Toyen, 0608 Oslo 6, Norway. Phone: (20) 64 77 25. Telex: 76476 9 (CW NOR N).

People's Republic of China: Chen Mingkun, China Computerworld, 74 Lu Gu Gun Road, P.O. Box 750, Beijing 10039, People's Republic of China. Phone: (47) 814 6174. Telex: 222214 (CCW CN).

Spain: Neil Kelley, Computerworld/Espana, Barquillo 21-3 izda, Madrid-4, Spain. Phone: 231 23 85; 231 23 86; 231 23 88. Telex: 47894 (CW E).

Sweden: CW Communications AB, Sodra Hamnvagen 22, S-115 41 Stockholm, Sweden. Phone: 46 8 67 91 80. Telex: 14904 9 (NOVACW).

Switzerland: Gebhard Osterwalder, CW Publikationen AG, Witikonerstrasse no. 15, CH - 8032 Zurich, Switzerland. Phone: (01) 55 10 77. Telex: 816710.

Taiwan: Grace Tang, ACE Media Agency Ltd., Room 503, 1, Fu Hsin S. Road, Sec. 1, Taipei, 10587, Taiwan, R.O.C. Phone: 751 3636. Telex: 14142 (ACE GROUP). (Representative for all CWCI publications).

United Kingdom: Martin Durham, CW Communications Ltd., 99 Grays Inn Rd., London, WCI 8UT, United Kingdom. Phone: (01) 831-9252, Telex: 262346.

Euan Rose, Bill Dunlop, Barbara Levy, Christine Taylor, Beere Hobson Assoc., 345 Goswell Rd., Islington, London EC1, United Kingdom. Phone: (01) 278 3415. Telex: 311951. (Representatives for CWCI publications).

Venezuela: Kalman von Vajna Nagy, CW Comunicaciones, C.R.L. Torre Maracaibo, Piso 10, Oficina H, Av. Libertador, Caracas, Venezuela. Phone: 72-76-30.

West Germany: Eckhard Utpadel, CW Publikationens GMBH, Friedrichstrasse 31, 8000 Munchen 40, West Germany. Phone: (089) 38172-0. Telex: 5215350.

Advertisers Index

Advanced Systems, Inc.	57
ALPS America	46-47
Aluminum Case Company	26
D. Appleton	113
Applied Software	26
AT&T Information Systems	106-107
BASF	115
B I Moyle Associates	37
Boeing Computer	84-85
Brookvale Associates	26
Businessland	35
Cambridge Systems	40
CGI Systems	70
Chicago Soft	90
Cincom Systems	41
CMI Corp.	76
Codex Corp.	105
Compaq Computer Corp.	60-61
Computer Associates	91
Computer Corporation of America	97
Computer Management Research	25
Computer Technology Group	24
Concurrent Computer Corp.	69,71-73,75,121
Cullinet	9
CW Japan	82
CW Executive Report	114
CW Focus	120
CW NCC Daily!	96
Data General Corp.	83
The Data Group	23
Data Language Corp.	12-13
Datagraphix	44-45
Datasphere	26
Dataware Systems Leasing	85
Digital Communications Associates	64
Digital Equipment Corp.	38-39
Duquesne Systems	74
EASTCOM	25
EMC Corp.	59
Fibronics	10
Forte Data Systems	108-109
Honeywell Information Systems	52-53
IBM	143
Infotron Systems	30
Innovation Data Processing	5
Interactive Solutions	113
Language Technology	102-103
Lee Data Corp.	100-101
Local Data	10,90
MacMillan Book Club	104
McCormack & Dodge	33
MG Rush Systems	42
Michaels, Ross & Cole, Ltd.	84
Micro Focus	6
Micro Pro	116-117
MSA	144
NCR Corp.	87-89
NEC	98-99
Netec	96
NMTC-Boston	122-123
Northern Telecom	94-95
Okidata	27
On Line Software International	48
Oracle Corp.	11,19
Pace Applied Technology	55
Pactel Spectrum	66-67
Quadram	80
Qume	28-29
Realia Inc.	54
Sage Systems	110-111
SAS Institute	20-21,70,86
Siecor Corp.	78-79
Signal Technology	57
Software AG	118-119
The Software Group	63
Software House	32
Software International	51
Softworks, Inc.	80
Southwest Software	58
Spectragraphics	22
SSCP	42
StarTech Software Systems, Inc.	82
Stern Consulting	12
Stratus Computer	112
Syncsort	3,36
Texas Instruments	62
Topaz	34
Virtual Microsystems	58
VM Software, Inc.	7
Wang Laboratories	18
Wells American	68
Wyse Technology	92-93
Xerox	14-15

This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.

Akers predicts 'demanding year'

From page 142

will introduce software, storage and communications enhancements.

- Supercomputing. Akers said IBM "expects to participate to a greater degree" in supercomputing applications. He cited strong response to the vector processing option on 3090 series mainframes from many customers, including Houston-based oil industry customers.
- Software source code. Responding to an independent software developer who claimed that IBM has not followed its own guidelines for easing the transition from its formerly unprotected source code, Akers defended IBM's 1983 decision to make its code proprietary. "We feel a tremendous obligation to serve our customers, but we feel no obligation to serve our competitors," he said.
- PC Convertible compatibility. Akers refused any comment on plans to make the recently announced laptop compatible with 5¼-in. drives.

Most shareholder attention focused on IBM's continued business in racially torn South Africa. Refusing to follow the recent withdrawals by corporations such as AT&T [CW, April 21], General Electric Corp. and Microsoft Corp. (see story below), IBM stockholders overwhelmingly defeated a shareholder proposal calling for IBM to end its South African business by the end of the year. IBM's board of directors had recommended the proposal be rejected, and it was supported by only 7% of the shares voted.

Both Akers and retiring Chairman John R. Opel said that IBM feels it is a progressive force for change in South Africa's separatist apartheid system. Opel said less than 0.5% of IBM's worldwide revenue comes from sales in South Africa and noted that IBM has reduced its work force there by 400 to 1,500 in the last 18 months.

"As a force for change, presence is better than absence," Opel said. He later admitted, however, that IBM believes "it is not within our power as a corporation to change political events in that country."

Microsoft severs S. Africa ties

REDMOND, Wash. — Microsoft Corp. recently severed business ties with South Africa because the firm said it believes its withdrawal will have more political impact in ending racial segregation there than its economic participation has.

Microsoft, which sold about $100,000 worth of software per year in the country, ended its agreement with South African computer distributor Automated Office Systems. Automated Office Systems currently distributes software from other leading U.S. vendors such as Lotus Development Corp., Micropro International Corp. and Borland International, Inc. as well as peripherals from firms such as AST Research, Inc.

Robert O'Rear, Microsoft's director of intercontinental operations, urged other U.S. computer firms to follow Microsoft's lead. "That's our hope," he said. "If we all join forces, we will send a stronger message."

Formerly, Microsoft donated its profits from South African sales to a charity, the American Friends Service Committee, that seeks to end apartheid.

"The pressure we have tried to bring as a participant hasn't had the impact that we had hoped," O'Rear said. "We have tried to change things by diplomatic means for as long as we thought we could."

O'Rear's comments were in sharp contrast to those from AT&T officials, who downplayed the significance of their firm's similar action.

BUSINESS NOTES

Memorex lays off 300 employees

Citing increased competition within the IBM mainframe disk drive market, **Memorex Corp.** last week laid off 300 workers in its Santa Clara, Calif., facilities. The layoffs affect workers in manufacturing, marketing and administration. Parent company Burroughs Corp. recently pointed to Memorex as one source of its 66% decline in profits for the quarter ending March 31.

■

Apollo Computer, Inc. signed a $50 million OEM agreement with longtime customer **Mentor Graphics Corp.** of Beaverton, Ore. The one-year, renewable contract allows Mentor to resell Apollo's recently introduced workstations, the low-end Series 3000 Personal Workstation and the high-end DN570, in its line of computer-aided engineering and design systems.

■

In an unusual hookup between an artificial intelligence software developer and a workstation vendor, **Intellicorp** and **Sun Microsystems, Inc.** announced they will jointly market Intellicorp's Knowledge Engineering Environment on Sun-3 workstations. The Intellicorp AI development software previously ran only on dedicated LISP workstations. Intellicorp Chairman and CEO Tom Kehler called the pact "a significant step in our strategy of making our development and delivery products widely available on general-purpose workstations."

■

Continuing its pattern of joint ventures in computer-integrated manufacturing (CIM), **IBM**'s manufacturing systems division has teamed up with **Cincinnati Milacron, Inc.**, a vendor of factory floor controllers, to develop CIM software. The software is intended for workstations such as the IBM Industrial Computer.

CDC turnabout impressive, but investors still cautious

ACTIVE ISSUES
Kathy Porteus

Is now the time to reconsider Control Data Corp. (CDA — 22)?

Investors should be familiar with CDC's plight of last year when substantial losses, primarily in its computer businesses, forced the company to cancel a public offering, technically default on short-term loans and dramatically streamline operations. Investors may be less acquainted with the progress in CDC's turnaround.

Two weeks ago, CDC reported a first-quarter loss of $21.2 million, representing a significant improvement over last year's fourth-quarter losses of $297.2 million that included $121 million in special charges for restructuring. According to analysts, CDC's peripheral products business experienced a strong pickup during the March quarter. Also, the company's financial subsidiary, Commercial Credit Co., is beginning to show the benefits of a major restructuring.

Such positive signs cause some analysts to favor CDC as an investment opportunity.

"I see considerable improvements in CDC's stock price," says Gerard Hallaren, vice-president with Brean Murray Foster Securities, who currently recommends purchasing CDC stock. "By year-end 1986, the company's strategies will be a lot clearer than they are now." According to Hallaren, investors currently overlook how CDC is confronting Japanese competitors of its high-end disk products, how its mainframe business continues attracting new customers and how its Commercial Credit subsidiary provides a "safety net" worth at least $19 a share.

"Japanese competition has been taking market share from CDC for a number of years," Hallaren says, "but I think that's going to reverse very soon." Such a change reflects high-reliability product ratings from customers and the rising value of the Japanese yen, which has thwarted Japanese aggressive pricing policies. Hallaren also cites improvements in CDC's mainframe business, in which 33% of last year's shipments went to new customers "at a time when the press on CDC was horrible."

Matt Meehan, vice-president with Salomon Brothers, Inc., is also positive about CDC's prospects, but he recently changed his recommendation from "accumulate shares" to "hold." He says he still believes that "the stock has the potential for considerable upside movement over the long term."

Nevertheless, Meehan expresses concern over a decline in computer system orders and certain financing issues that should have been resolved a month ago. These issues include CDC's sale of its Ticketron entertainment and wagering business, completion of bank agreements regarding the company's debt and the sale of public or private debt. "Indeed, when these things come together," Meehan says, "I would go back in on a more positive note."

Most analysts estimate CDC will break even in its current fiscal year ending Dec. 31, 1986, assuming that the company will return to profitability in the second half. But because of CDC's multifaceted reworking of its core businesses, financial subsidiary and bank agreements, many analysts and investors still prefer watching CDC's recovery process from the sidelines.

"Key to Control Data's return to profitability this year," says Gary Blauer, securities analyst with Dain Bosworth & Co., "is a recovery in the industry as a whole." Although Blauer acknowledges improvements in the company's ability to win in competitive situations, he says he feels "no hurry to jump in because Control Data's turnaround is still too far out."

Porteus is president of Strand Research Associates, a Centerville, Mass.-based company that provides customized research services for financial and high-tech firms.

MSA agrees to acquire financial, human resources software firm

ATLANTA — Management Science America, Inc. (MSA) said last week it agreed in principle to acquire Information Associates, Inc., a Rochester, N.Y.-based vendor of financial and human resources software for the higher education institution market. The agreement is for MSA to pay $15 million in cash.

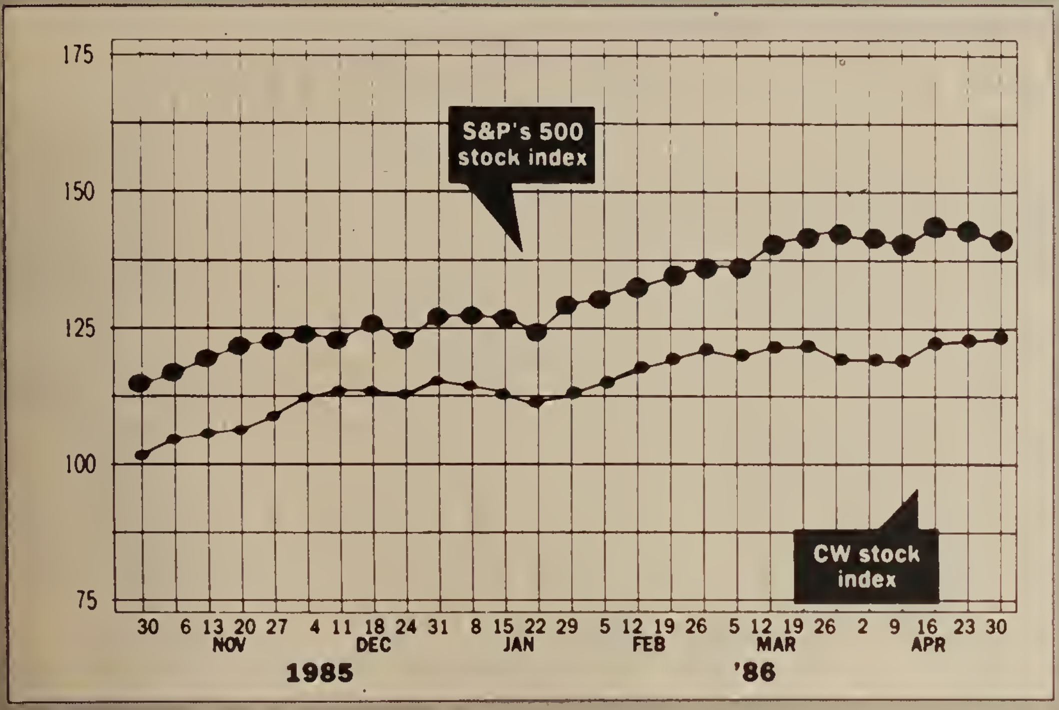
It was the second such announcement for MSA within a few weeks. Last month, MSA said it agreed to acquire RTS Ltd., a Dublin-based vendor of manufacturing and financial software for IBM's System/36 and 38 minicomputers [CW, April 7].

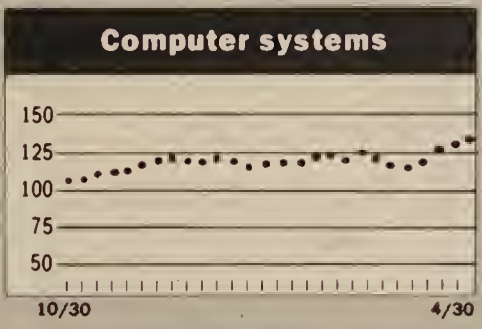
MSA will continue to expand its product line through acquisition and internally funded research and development, the company said.

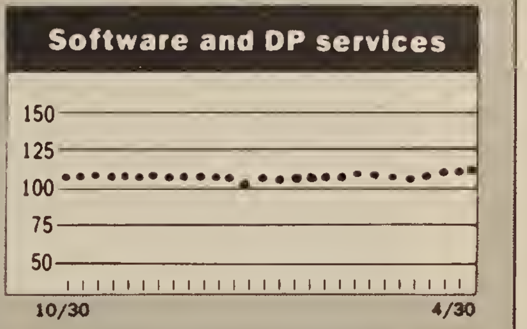
Information Associates' flagship product line is the Series Z, composed of software systems for financial records, student information, human resources and alumni records development, that operates on IBM mainframes or Digital Equipment Corp. VAX computers.

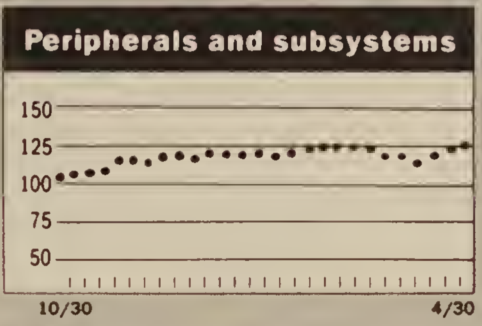
MITCHELL J. HAYES

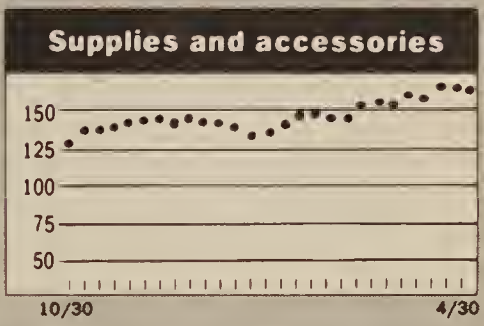
Computerworld stock trading index





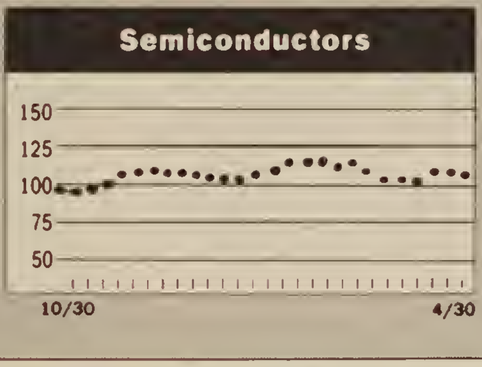


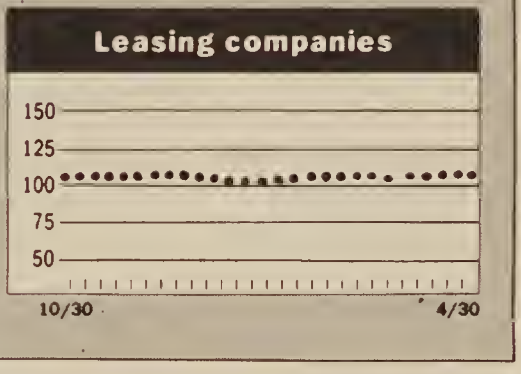




All indexes reflect a historical base of 100 on Dec. 31, 1984, and trace stock market performance in relation to that base. The CW stock index represents the unweighted average performance of the six categories of computer industry stocks.

	4/23/86	4/30/86
Computer systems	126.7	**128.7**
Software and DP services	105.7	**105.8**
Peripherals and subsystems	123.0	**122.2**
Supplies and accessories	157.7	**156.3**
Semiconductors	108.3	**110.5**
Leasing companies	104.6	**105.0**
CW stock index	120.6	**121.1**
Standard and Poor's 500 stock index	144.6	**140.8**





Computerworld stock trading summary

CLOSING PRICES WEDNESDAY, APRIL 30, 1986

COMPUTER SYSTEMS

EXCH		52-WEEK RANGE (1)	PRICE CLOSE APR 30 1986	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALPHA MICROSYSTEMS	5- 9	6 1/4	-1/4	-3.8
O	ALTOS COMPUTER SYST	9- 19	19 1/4	+1 5/8	+9.2
A	AMDAHL CORP	10- 18	16	+1	+6.6
O	APOLLO COMPUTER	9- 31	15 3/4	0	0.0
O	APPLE COMPUTER INC	14- 31	30 1/4	+5/8	+2.1
N	AT&T	19- 28	24 3/4	-1/4	-1.0
N	8URROUGHS CORP	52- 71	61	-1	-1.6
O	COMPAQ COMPUTER CP	5- 17	16 3/4	+1/8	+0.7
O	COMPUTER AUTOMATION	1- 9	2 1/8	+1/4	+13.3
A	COMPUTER CONSOLES	5- 14	10 5/8	+7/8	+8.9
N	CONTROL DATA CORP	15- 39	22 7/8	+1	+4.5
O	CONVERGENT TECHNOL	5- 13	9 3/4	-1/2	-4.8
O	CPT CORP	5- 8	4 1/2	-1/8	-2.7
N	CRAY RESEARCH INC	25- 79	78 7/8	-1/2	-0.6
O	DAISY SYSTEMS CORP	11- 38	13 1/2	+1/4	+1.8
N	DATA GENERAL CORP	31- 76	41 5/8	-2 5/8	-5.9
N	DATAPOINT CORP	5- 22	5 1/4	+1/8	+2.4
N	DIGITAL EQUIPMENT	85- 181	176 1/2	-4 7/8	-2.6
A	EECO INC	13- 16	15	+1/2	+3.4
N	ELECTRONIC ASSOC.	3- 7	5 7/8	-1/2	-7.8
N	FLOATING POINT SYST	18- 42	42 1/4	+1 3/4	+4.3
N	FOX8ORO	22- 31	27 1/4	-1/8	-0.4
N	GOULD INC	20- 38	25 3/4	-1 1/4	-4.6
N	HARRIS CORP	22- 35	32 1/4	+2 1/2	+8.4
N	HEWLETT-PACKARD CO	29- 45	45 1/4	-1/8	-0.2
N	HONEYWELL INC	54- 87	75 1/8	-1/2	-0.6
N	I8M	117- 158	156 1/4	+1	+0.6
O	IPL SYSTEMS INC	1- 4	2 1/2	0	0.0
N	ITT CORP	28- 47	47 1/8	+1/4	+0.5
N	M/A-COM INC	13- 24	16 7/8	+1/8	+0.7
N	MANAGEMENT ASSIST	2- 28	2 1/4	0	0.0
N	MATSUSHITA ELEC(ADR)	49- 98	98 3/8	+7 1/8	+7.8
O	MENTOR GRAPHICS	13- 30	17 1/2	-5/8	-3.4
N	MODULAR COMPUTER SYS	6- 9	8 7/8	+3/4	+9.2
N	MOHAWK DATA SCI	1- 13	3 1/8	0	0.0
N	N8I INC	11- 2	12 1/8	+1/8	+1.0
N	NCR	25- 50	50 1/8	-1/8	-0.2
N	PERKIN-ELMER	22- 36	32 1/8	+1 3/8	+4.4
N	PRIME COMPUTER INC	15- 27	21 5/8	+1 1/8	+5.4
N	SPERRY CORP	39- 59	55	+1/4	+0.4
O	STRATUS COMPUTER INC	9- 25	22 1/4	-1	-4.3
O	TANOEM COMPUTERS INC	13- 31	31	+2 1/8	+7.3
N	TANDY CORP	24- 44	38 1/2	-7/8	-2.2
O	TELEVIDEO SYSTEMS	2- 4	3 7/8	0	0.0
O	TELXON CORP	10- 32	30 1/2	-1	-3.1
N	TEXAS INSTRUMENTS	86- 141	139	-1 3/4	-1.2
A	ULTIMATE CORP	8- 32	30 7/8	+1 5/8	+5.5
O	VECTOR GRAPHICS INC	1- 1	1/8	0	0.0
A	WANG LA8S "8"	15- 29	19 1/8	+2 1/4	+13.3
A	WANG LA8S "C"	15- 29	18	+3/8	+2.1
N	XEROX CORP	37- 72	60	+1 1/4	+2.1

SUPPLIES & ACCESSORIES

EXCH		52-WEEK RANGE (1)	PRICE CLOSE APR 30 1986	WEEK NET CHNGE	WEEK PCT CHNGE
N	AMERICAN 8US PRODS	21- 36	36 3/8	+1/4	+0.6
N	8ARRY WRIGHT	17- 29	23 1/4	-1/4	-1.0
A	DUPLEX PROOUCTS INC	13- 22	21 1/2	0	0.0
N	ENNIS 8US. FORMS	14- 28	23 1/4	-2 1/8	-8.3
N	3M COMPANY	74- 107	104 3/4	+1 3/4	+1.6
N	MOORE CORP LTD	15- 27	26 1/2	+3/8	+1.4
O	STANDARD REGISTER	22- 45	41 3/4	0	0.0
N	WALLACE COMP SERVICE	30- 48	47 3/8	-5/8	-1.3

EXCH: N=NEW YORK; A=AMERICAN; P=PACIFIC; 8=8OSTON;
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER; S = SPLIT

O-T-C PRICES ARE 8IO PRICES AS OF 3 P.M. OR LAST 8IO
(1) TO NEAREST DOLLAR

SOFTWARE & DP SERVICES

EXCH		52-WEEK RANGE (1)	PRICE CLOSE APR 30 1986	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	2- 5	5 1/8	+5/8	+13.8
N	ADVANCED SYSTEMS INC	9- 20	17 5/8	-5/8	-3.4
N	AGS COMPUTERS INC	10- 25	22 1/4	+1 3/8	+6.5
O	AMERICAN SOFTWARE	9- 15	10 3/4	+1/8	+1.1
N	ANACOMP INC	2- 6	5 7/8	+1/2	+9.3
O	ANALYSTS INTL CORP	5- 11	6 3/4	0	0.0
O	ASHTON TATE	6- 27	26 1/2	+1/8	+0.4
O	ASK COMPUTER SYSTEMS	7- 25	13 1/2	-1/4	-1.8
8	ASTRADYNE COMP IND	1- 3	1 3/4	0	0.0
N	AUTOMATIC DATA PROC	35- 70	68	-1 1/2	-2.1
O	COMPUTER NETWORK	5- 9	7 1/2	0	0.0
O	COMPUTER ASSOC INT'L	18- 42	42	+1 1/4	+3.0
O	COMPUTER HORIZONS	5- 11	13	-3/8	-2.8
N	COMPUTER SCIENCES	13- 36	35	+7/8	+2.5
O	COMPUTER TASK GROUP	10- 28	28	+1/2	+1.8
O	COMPUTER USAGE	1- 3	1 7/8	0	0.0
O	COMPUTONE SYSTEMS	3- 11	5 1/8	+1/8	+2.5
O	COMSERV CORP	1- 6	4 3/8	0	0.0
O	COMSHARE	7- 12	10 3/4	+1/8	+1.1
N	CULLINET SOFTWARE	12- 33	14	+3/8	+2.7
O	CYCARE SYSTEMS INC	14- 27	13 1/2	+1/4	+1.8
O	HOGAN SYSTEM INC	4- 12	10 1/4	+1 7/8	+22.3
N	GENERAL ELECTRIC CO	56- 79	78 1/8	-3/4	-0.9
N	GENL MOTORS E (EDS)	20- 48	47 1/2	+1 1/8	+2.4
N	GTE CORP	38- 54	50 5/8	-1 1/2	-2.8
O	INFORMATION SCIENCE	1- 5	3 1/8	0	0.0
O	INFOTRON SYSTEMS CP	13- 24	15 1/2	+1 1/4	+8.7
O	KEANE ASSOCIATES	10- 20	15 1/2	+1 1/4	+8.7
N	LOGICON	25- 43	35 3/4	-3/8	-1.0
O	LOTUS DEVELOPMENT CP	15- 36	35 1/2	+2	+5.9
O	MCI COMMUNICATIONS	7- 13	10 1/8	-1/4	-2.4
O	MNGT SCI AMER INC	7- 16	13 7/8	-5/8	-4.3
O	MATHEMATICAL APP GRP	1- 8	1 7/8	0	0.0
O	MICOM SYSTEMS INC	12- 35	17	0	0.0
O	MICROPRO INT'L CP	2- 4	3 1/4	+1/8	+6.0
O	NATIONAL DATA CORP	8- 24	22 7/8	+1/8	+0.5
O	ON-LINE SOFTWARE INT	4- 14	13 3/4	+1/8	+0.9
N	PANSOPHIC SYSTEMS	14- 34	33 3/8	-1/4	-0.7
N	PLANNING RESEARCH	11- 23	21 1/4	+7/8	+4.2
O	POLICY MGMT SYSTS CP	16- 35	18 1/2	+1 1/2	+8.8
O	PROGRAMMING & SYS	4- 10	8 3/4	-1/2	-5.4
O	REYNOLDS & REYNOLD	30- 65	30 1/4	-1 3/4	-5.4
O	SEI CORP	13- 27	24 1/2	-1/2	-2.0
O	SHARED MEDICAL SYST	26- 38	37 1/8	-7/8	-2.3
O	SCIENTIFIC COMPUTERS	4- 8	4 5/8	0	0.0
O	SOFTWARE AG	12- 22	16 7/8	-7/8	-4.9
N	URS CORP	10- 18	16 7/8	-3/4	-4.2
N	UCCEL	11- 20	20 1/8	-1/4	-1.2
O	VM SOFTWARE	17- 25	25 1/4	+1 3/4	+7.4

SEMICONDUCTORS

EXCH		52-WEEK RANGE (1)	PRICE CLOSE APR 30 1986	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADVANCED MICRO OEV	22- 36	28 3/8	-1 1/4	-4.2
O	AOV'D SEMICONOUCTOR	7- 23	13	+1	+8.3
N	ANALOG DEVICES INC	14- 24	23 3/4	+3/4	+3.2
O	ANALOGIC CORP	11- 16	12 1/2	+1	+8.6
N	APPLIED MAGNETICS CP	9- 19	19 1/4	+3/4	+4.0
O	AVANTEK	18- 26	21 3/4	-1/4	-1.1
O	HADCO CORP	3- 7	4 3/4	+3/8	+8.5
O	INTEL CORP	21- 33	28 1/2	-1/4	-0.8
O	MICRO MASK INC	5- 12	5 7/8	0	0.0
N	MOTOROLA INC	29- 48	46 3/8	-1 7/8	-3.8
N	NAT'L SEMICONDUCTOR	10- 15	14 1/8	-1/8	-0.8
N	TERADYNE	17- 33	27 3/8	+3/4	+2.8

PERIPHERALS & SU8SYSTEMS

EXCH		52-WEEK RANGE (1)	PRICE CLOSE APR 30 1986	WEEK NET CHNGE	WEEK PCT CHNGE
P	AM INTERNATIONAL	3- 8	7 3/4	-1/2	-6.0
A	ANDERSON JACO8SON	2- 5	2 1/8	0	0.0
O	AST RESEARCH INC	7- 33	20	-2 5/8	-11.6
O	AUTO-TROL TECHNOLOGY	3- 13	5 1/4	+1	+23.5
O	AVANT-GARDE COMPUTNG	3- 21	4 1/4	-1/2	-10.5
O	8ANCTEC INC	6- 12	11 1/8	-5/8	-5.3
O	8EEHIVE INT'L	1- 2	1/8	0	0.0
N	8OLT,8ERANEK & NEW	20- 42	42 1/8	+3/4	+1.8
O	CAM8EX CORP	1- 3	1 1/4	0	0.0
N	CENTRONICS DATA COMP	3- 11	5 3/8	-1/2	-8.5
A	CETEC CORP	6- 9	8 1/8	-3/8	-4.4
A	COGNITRONICS	4- 7	5 1/8	-1/8	-2.3
N	COMPUGRAPHIC CORP	23- 36	23 1/8	-1	-4.1
O	COMPUTER TRANSCEIVER	0- 1	1	0	0.0
N	COMPUTERVISION CORP	9- 44	16 3/8	+5/8	+3.9
N	CONRAC CORP	12- 18	17 1/2	+5/8	+3.7
A	DATAPROOUCTS CORP	11- 20	15 3/8	0	0.0
A	DATARAM CORP	4- 16	15 1/8	-5/8	-3.9
O	DATA SWITCH CORP	4- 9	7 1/2	-3/8	-4.7
O	DATUM INC	5- 9	6 3/8	+3/8	+6.2
O	DECISION DATA COMPUT	10- 20	12 1/8	+1/8	+1.0
O	ENDATA, INC	2- 8	6 5/8	+1/8	+1.9
O	EVANS &SUTHERLANO	12- 27	26 3/8	-5/8	-2.3
O	GANOALF TECHNOLOGIES	5- 13	6 1/2	-1/4	-3.7
N	GEN'L DATA COMM IND	8- 21	11 7/8	+1/8	+1.0
N	HAZELTINE CORP	18- 30	18 1/8	-1/2	-2.6
O	ICOT CORP	3- 12	12 3/8	+3/4	+6.4
O	INFORMATION INTL INC	10- 17	13 3/4	+1 1/4	+10.0
O	INTECOM INC	3- 11	4 1/8	+3/4	+22.2
O	MEGADATA CORP	3- 8	3 1/8	-3/8	-10.7
A	MSI DATA CORP	7- 13	12 5/8	+1 1/4	+10.9
N	NASHUA CORP	24- 52	50 3/4	-1 1/2	-2.8
O	NETWORK SYSTEMS CORP	11- 27	13 7/8	-3/4	-5.1
N	NO AMERICAN PHILIPS	32- 47	45	-1 1/2	-3.2
N	NORTHERN TELECOM LTD	26- 41	30 1/4	+1 1/8	+3.8
O	OMEX	1- 3	3/8	0	0.0
N	PARADYNE CORP	6- 18	8 1/2	-1/2	-5.5
A	PENRIL CORP	7- 14	7 5/8	+1/4	+3.3
N	PLESSEY CO (AOR)	19- 38	37 1/2	+3 1/8	+9.0
O	PRINTRONIX INC	9- 18	13 3/8	+3/4	+5.9
O	QMS INC	6- 16	12 1/4	+7/8	+7.6
O	RAMTEK CORP	2- 7	4 1/4	+1/8	+3.0
N	RECOGNITION EQUIP	9- 17	13 3/4	+7/8	+6.7
N	SANOERS ASSOCIATES	30- 44	31 1/2	-10 1/4	-24.5
O	SCAN-TRON CORP	9- 22	18 3/4	-2	-9.6
N	SCIENTIFIC ATLANTA	10- 15	11	-3/8	-3.2
O	SEAGATE TECHNOLOGY	5- 13	12	-1/4	-2.0
N	STORAGE TECHNOLOGY	1- 5	4	-1/4	-5.8
O	SYKES DATATRONICS	0- 2	3/8	0	0.0
A	T 8AR INC	5- 9	6 1/4	-1/4	-3.8
A	TA8 PROOUCTS CO	14- 23	21	-1 3/8	-6.1
O	TANOON CORP	3- 9	5 7/8	0	0.0
A	TEC INC	6- 13	6	-1/8	-2.0
N	TEKTRONIX INC	47- 68	58 1/2	+1 3/4	+3.0
N	TELEX	34- 68	61	-1 1/4	-2.0
O	TESDATA SYSTEMS CP	0- 3	5/8	-1/8	-16.6
N	TIMEPLEX INC	15- 23	16 7/8	+1/2	+3.0
N	TITAN CORP	4- 11	10 1/2	0	0.0
O	VISUAL TECHNOLOGY	1- 3	5/8	-1/16	-9.1

LEASING COMPANIES

EXCH		52-WEEK RANGE (1)	PRICE CLOSE APR 30 1986	WEEK NET CHNGE	WEEK PCT CHNGE
N	COMDISCO INC	7- 24	22 1/4	-1 1/2	-6.3
N	CONTINENTAL INFO SYS	5- 21	20 5/8	+2 1/8	+11.4
O	FINALCO GROUP INC	4- 5	4 1/8	0	0.0
O	PHOENIX AMERICAN INC	2- 6	4 7/8	-1/8	-2.5
O	SELECTERM INC	6- 12	7 1/2	+1	+15.3
N	U.S. LEASING	32- 46	43	+3/4	+1.7

Source: Trade Quotes, Inc.

COMPUTER INDUSTRY

INSIDE

GEISCO pursues new applications as the time-share market fades/**113**

The slow growth in the software and services industry will continue/**114**

Sperry ends a down year; Compaq reports another strong quarter/**120**

Control Data: An investor's bargain?/**140**

INSTANT ANALYSIS

"I am not convinced that corporate America needs an 80286-based machine on every desk."

— Andrew M. Seybold, the Seybold Group, Inc.

Akers sees 'demanding year'

Tells IBM shareholders cost controls will continue

By Clinton Wilder

HOUSTON — Warning of a "demanding year ahead," IBM President and Chief Executive Officer John F. Akers told IBM shareholders last week that Big Blue will continue its stringent controls on expenses and hiring until its U.S. business shows a significant pickup.

In remarks at IBM's 1986 annual meeting, Akers noted that the company cut discretionary expenses for travel and meetings by 10%, or $700 million, during 1985. He said such cost controls will continue and that IBM will reduce its hiring from college campuses much more than it did last year, to fewer than 1,000 graduates.

"We believe the prudent course for IBM is to expect a demanding year ahead, to make ourselves as a company as lean and vigorous as possible, and thus ready to take on our competitors when the turnaround comes," Akers said.

Akers did not predict when that might occur, but most indications so far in 1986 have pointed to another sluggish year for IBM and the mainframe industry in general.

In response to a stockholder inquiry about a potential stock split, Akers said the IBM board would not consider another split of stock without a significant improvement in its U.S. business. The company did, however, declare its regular quarterly dividend of $1.10 per share.

Although Akers refused to disclose specific product plans, he answered shareholder questions on the following product areas:

• System/36 and 38. Akers said IBM is working on hardware and software enhancements to provide better migration from its often-criticized mid-range sytems to 370-architecture mainframes. For the office environment, he said the company

See **AKERS** page 140

Olsen chides management

By Alan Alper

NEW YORK — The computer industry will not shake its debilitating doldrums until top managers at user corporations worldwide gain a better understanding of systems already installed and become more involved in the purchase of new technology, Kenneth H. Olsen, president and founder of Digital Equipment Corp. told a Wall Street gathering.

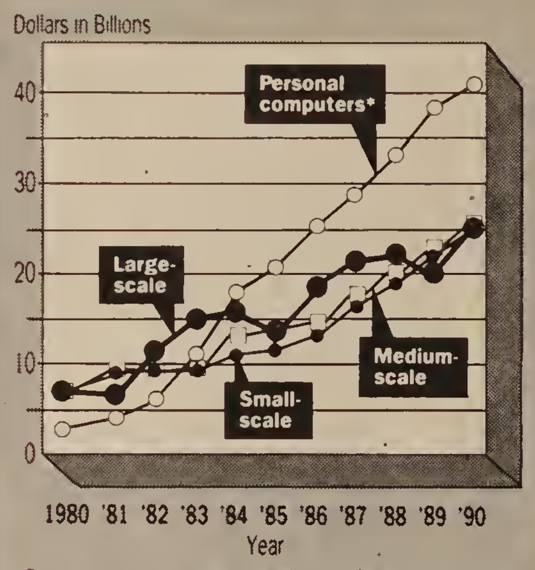
Speaking at a meeting of the New York Society of Security Analysts last week, Olsen said many of the industry's problems stem from tax laws that encourage corporations to purchase computers in excess of their needs, systems that in many cases cannot communicate with one another.

"People at the top are not used to getting involved," Olsen said. "They blame the computer industry for computers that can't talk to one another. I tell them,

See **OLSEN** page 117

DATA VIEW

Computer shipments: Dollar value worldwide for the 1980s



* Personal computer value is based on retail sales; the dollar value of other sectors is figured on the basis of vendor revenue.

Information provided by International Data Corp.

MITCHELL J. HAYES

INDUSTRY INSIGHT
Edward Warner

Tandy, Apple show their age

Tandy Corp. and Apple Computer, Inc. have two of the longest life spans of any of the players in the personal computer industry. This year, while both have announced increased profitability, both are also showing their age; they have too long relied on cash-cow products whose technology blossomed years ago.

Tandy troubles arise from the double whammy of being in the computer retailing business (a fairly unprofitable line of work) and marketing personal computers that are either technologically outdated or at the mercy of Asian underpricing.

Tandy may have announced a 92% increase in profitability in its recent third quarter, but the majority of that $42 million in earnings came from consumer electronics products; revenue from Tandy's Computer Centers and Radio Shack stores was flat.

That could spell trouble in the long run for a company that gets a full 30% of its revenue from computers and peripherals.

Earlier this month Paine Webber, Inc. said in a report that it had downgraded its expectation of Tandy's earnings per share in fiscal 1986 from $2.75 to $2.60. Paine Webber blamed Tandy's disappointing PC sales.

In its most recent quarter, Apple also showed increased profitability. The $31.8 million that it earned in that quarter, while three times the revenue of the same period a year ago, came as revenue dropped 6% to $408.9 million. Apple is not making money from ex-

See **TANDY** page 116

Warner is editor of the Computerworld News Service.

Future Computing shuts down

McGraw-Hill dissolves mart research subsidiary

By Clinton Wilder

DALLAS — Future Computing, Inc., once the leading market research firm specializing in microcomputer tracking, was formally dissolved last week by its parent company, publishing giant McGraw-Hill, Inc.

Future Computing, which was widely rumored to be experiencing heavy financial losses in recent months, will be absorbed by another McGraw-Hill research subsidiary, Datapro Research Corp. Delran, N.J.-based Datapro, which publishes a highly regarded annual survey of mainframe users, will hire about 20 of Future Computing's employees.

McGraw-Hill laid off 58 other Future Computing workers, and cofounder and Chairman Egil Juliussen will leave at the end of the month.

Future Computing's rise and fall coincided with the growth and shakeout of the micro industry. Founded in 1981 by Juliussen and his wife Portia Isaacson, Future Computing reached estimated revenue of $7 million in 1984. The cofounders sold the firm to McGraw-Hill in July 1984.

Many in the industry believe that Future Computing lost credibility through overly optimistic projections of growth in microcomputer markets. But McGraw-Hill denied that the unit's credibility was a factor in its decision to terminate the business.

IBM fires volley in war on PC clones, protects AT system box design in UK

By Ralph Bancroft and Charles Brown
Computerworld News Service

LONDON — In the latest battle in its UK war on Personal Computer clones, IBM registered the design of its Personal Computer AT system box, gaining protection against copying by other manufacturers.

By registering the design of the AT box under the Registered Designs Act of 1949, IBM gained 25 years' protection against copying of the AT box's look, even where the physical dimensions of the copy are different.

The action also closed a loophole that may have enabled one London clone supplier, Qubie Ltd., to sell PC AT look-alikes. Qubie Managing Director Roger Harvey said IBM lawyers have already written him to demand that his firm sign a written agreement to stop selling its BT AT model or face legal action.

Comcen Ltd., the British company chosen by the IBM PC Users Group for its so-called approved clone, recently changed its front panel and read-only memory BIOS to avoid litigation, although it insisted that none of the changes it made to its clones have come at IBM's urging.

According to Comcen Sales Manager Gary Stone, IBM's crackdown on the clones was predictable. "With the numbers of compatibles selling, IBM is bound to be upset," he observed. "We just want to keep our act clean."

Our most advanced personal computer advances again.

With the Personal Computer AT,® IBM put advanced technology to work. To help boost performance.

But even advanced technology keeps advancing.

Now IBM introduces enhanced models of the Personal Computer AT—computers that raise high performance even higher.

Think fast.

For some people, fast isn't quite enough. So the new models of the Personal Computer AT run up to 33% faster.

That means you can recalculate even the biggest spreadsheets in a flash. And sort through your data with astonishing speed.

Store more.

Big news for people who work with big files.

A Personal Computer AT can now store more information than ever. IBM gives you a choice of hard files (fixed disks)—including a 30-megabyte size that stores up to 15,000 pages of words and numbers.

And if that's not enough, double it. Just add a *second* 30MB hard file, for a total capacity of 60MB.

A choice of hard files to meet your storage needs.

A new set of keys.

Today, you can select an IBM Personal Computer AT with an enhanced keyboard.

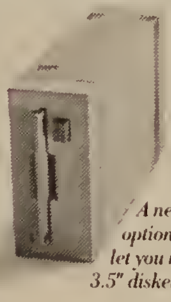
It has separate cursor keys, a separate numeric keypad (for easier data entry) and twelve function keys.

It also has a main typing section that's modeled after the classic IBM Selectric® keyboard, which makes word processing easier than ever.

Diskettes that are just your size.

With a new option, the Personal Computer AT can run 3.5-inch diskettes. (They're smaller, but can store twice as much information as 360KB 5.25" diskettes.)

So now you can use programs and data in either format. And have the flexibility to work with other members of the IBM PC family that use 3.5" diskettes. Including the new IBM PC Convertible.



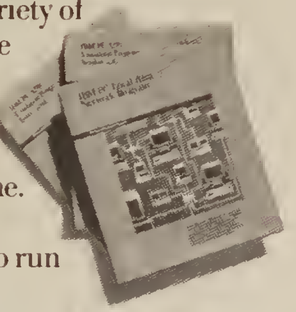
A new option to let you run 3.5" diskettes.

Family ties.

With new IBM products, the Personal Computer AT can more easily communicate with other PCs.

IBM's networking options, for example, let you share files from a variety of popular programs. While the IBM PC 3270 Emulation programs let you retrieve information from a mainframe.

You can also use the Personal Computer AT to run IBM PC XENIX® —an enhanced multi-user, multi-tasking operating system.



New programs to help you communicate with other PCs. And mainframes, too.

A powerful value.

The best news is, the Personal Computer AT now offers increased power without a higher price.

And if you qualify, you can conveniently charge your Personal Computer AT on IBM's Credit Card. Or lease one with the IBM Commercial Lease Agreement.

See the new models of the Personal Computer AT at an Authorized IBM PC Dealer. Or call your IBM marketing representative.

For the name of a store near you, call 1-800-447-4700. In Alaska, call 1-800-447-0890.

Little Tramp character licensed by Bubbles Inc., s.a.
IBM and Personal Computer AT are trademarks of International Business Machines Corporation.
XENIX® is a registered trademark of Microsoft Corporation. Based on System V.

©Copyright IBM Corporation 1986

OUR MANUFACTURING SOFTWARE IS TAKING
THEIR ECONOMIC SYSTEM OUT OF THE RED.

It's 1986. And some of the top people in the People's Republic have realized their backs are against the wall.

So who did they come to? Management Science America, Inc. After all, it takes more than inexpensive labor and material costs to compete in the twentieth century.

It takes a complete mainframe manufacturing resource planning system. Like ours.

Which offers products that other software companies don't. And includes INFORMATION EXPERT.™ The fourth generation technology that allows all your existing or new software systems to talk to one anothe

For more information, you can talk to people in the People's Republic. Or talk to people at MSA. Namely Robert Carpenter at 404-239-2000.

MSA SOFTWARE
INTELLIGENCE OF A HIGHER ORDER.™

© 1986 Management Science America, Inc.